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St. Mary's University, Ethiopia

THE CONTRIBUTION OF LOCAL COMMUNITY PARTICIPATION ON THE SUSTAINABILITY OF NATURAL RESOURCE MANAGEMENT PROJECTS IMPLEMENTED UNDER PRODUCTIVE SAFETY NET PROGRAM, GUBALAFTO WOREDA, AMHARA REGION

TILAHUN ADDIS, ID NO. SGS/0685/2008A

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Approved by Board of Examiners

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DECLARATION

I the undersigned declare that this thesis is my original work, prepared under the guidance of Dr Chalachew Getahun. All the sources of materials used for the thesis have been dully acknowledged. I further confirm that the thesis has been not been submitted either in or in full to any other higher learning institution for the purpose of earning any degree.

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        Tilahun Addis   Signature & Date

                                   St. Mary University, Addis Ababa, June, 2018

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ACRONYMS & ABBREVIATIONS

ANRS	Amhara National Regional State
AC	Area closure
CSA	Central Statistical Agency
DSA	Daily Subsistence Allowance
EGS	Employment Generating Scheme
ETB	Ethiopian Birr
FDRE	Federal Democratic Republic of Ethiopia
FEDD	Finance & Economic Development Department
FFW	Food for Work
FM	Forage/fodder Planation and Management
GoE	Government of Ethiopia
GOs	Government Organizations
GT	Gulley Treatment
HHH(s)	Household Head(s)
HH(s)	Household(s)
IS	Irrigation Scheme Development
LBPWs	Labor Base Public Works
MGDs	Millennium Development Goals
M&E	Monitoring and Evaluation
MYAP	Multi-Year Assistance Program
NRM	Natural Resource Management
NGOs	Non-Government Organizations
NM	Nursery Management
OECD	Organization for Economic Corporation and Development
ORDA	Organization for Rehabilitation and Development in Amhara
PW	Potable Water Development
PSNP	Productive safety Net Program
PIM	Program Implementation Manual
PCM	Project Cycle Management
PMI-PMBOK	Project management Institute-Project management Body of Knowledge Areas
WH	Rain Water Harvesting
REDD	Reducing Emissions from Deforestation and Forest Degradation
R2D	Relief to Development
RC	Rural Roads Construction Catchment Management
SWC	Soil and water Conservation
UNEP	The United Nations Environmental Program
UN	United Nations
USAID	United States Aid for International Development
UCLA	University of California, Los Angeles
WM	Watershed Management

GLOSSARY

Local terms and Concepts	Descriptions
Belg	Short or little rains season (late February to end of May/early June).
Birr	Ethiopian currency. One Birr is equivalent to 27.76USD (April 2018 Exchange rate)
Dega	Local term denoting the altitude of an area. *Dega* refers to areas above 2,200 meters above sea level.
Kebele	The smallest unit of local government in rural and urban communities in the Amhara Region of Ethiopia.
Kiremt	Main or long rains season (June to August), during which crops harvested in the *Meher* season are planted.
Meher	Harvest season (early October to late December) during which crops planted in the *kiremt* (long rains season) are harvested.
Kolla	Local term denoting the altitude of an area. *Kolla* refers to areas of land below 1300 meters above sea level.
Woina-Dega	Local term denoting the altitude of an area. *Woina-Dega* refers to areas of land of an altitude between 1,300 to 2,200 meters above sea level.
Woreda	The second administrative unit above the *kebele* in the current administrative structure of Amhara region, Ethiopia.

Source: Pernille, S. et al. (2004)

ABSTRACT

This research explored the effect of local community participation on the sustainability of natural resource management/NRM/ projects of Productive Safety Net Program/PSNP/ in Gubalafto Woreda of Amhara National Regional State. It focused to provide new insights in the study area in particular, and to implicate in North Wollo zone and Amhara regional state in general by employing both qualitative and quantitative approaches. Applying the qualitative approach involved the use of key informants selected by purposive sampling based on criteria like level of involvement, social responsibility in the community, knowledge and experience in PSNP-NRM projects, while in the quantitative method respondents were selected through random sampling disaggregated by public work, direct support, agro ecology, sex and age. In identifying target Kebeles for the study, non-probability sampling technique was applied using criterion of existence of all types of PSNP-NRM projects and activities in the kebele. Stata was the statistical tool used and ordered logistic regression model was applied in analyzing the data. Two objectives were focused in assessing practices of participation and issues of sustainability of the 10 PSNP-NRM projects under this study whereas the third objective was analyzing the effect of participation of local community on the sustainability of PSNP-NRM projects. Results show that, practices of true participation of local community in the PCMs of the 10 projects was poor. It was mostly limited to the execution phases. The issues of sustainability of those projects were also alarming that strategies have to be designed to ensure it. Sustainability was assessed based on 13 indicators (two indicators for environmental sustainability, two indicators for economic sustainability and 9 indicators for social sustainability) and the result showed that one project never met all the three pillars of sustainability at a time, that again indicated none of the projects are fully sustained, they all were found to be partially sustained. From the biological PSNP-NRM projects, area closure performed better as compared to others and nursery management /seedling plantation performed poorer than others. From physical PSNP-NRM projects, potable water development performed better and rain water harvesting performed poorer than others when measured against the sustainability criteria /indicators/. Effect of participation in PCMs of PSNP-NRM projects was statistically significant on environmental sustainability (indicator-wise use of project outcomes), social sustainability (indicators-job opportunity/security, establishment and running of CBOs and availability and access of social services). It was however statistically insignificant on economic sustainability (indicators-increase productivity/production and sale of products/byproducts.

Key words*: participation, sustainability, natural resource management/NRM/, productive safety net program/PSNP/, project, project cycle/phase, and ordered logit regression.*

CHAPTER I: INTRODUCTION

1.1. Background of the Study

Donor agencies, government of Ethiopia, non-governmental organizations/NGOs/ and food insecure rural households were the key stakeholders of PSNP. The Government of Ethiopia, WFP and development partners (PSNP development partners include the Canadian International Development Agency, Embassy of the Kingdom of the Netherlands, European Commission, Irish Aid, Swedish International Development Agency, United States Agency for International Development, UK Department for International Development, DANIDA and World Bank) work together to increase families' long-term resilience to food shortages in the study area. PSNP is aimed at enabling the rural poor facing chronic food insecurity to resist shocks, create assets and become food self-sufficient. PSNP provides multi-annual predictable transfers, as food, cash or a combination of both, to help chronically food insecure people survive food deficit periods and avoid depleting their productive assets while attempting to meet their basic food requirements (PSNP-PIM, 2010).

Amhara region contains much of the highland plateaus above 1,500 meters with rugged formations, gorges and valleys, as well as millions of settlement villages surrounded by subsistence farms and grazing lands. The land in Amhara has been cultivated for millennia with no variations or improvement in the farming techniques. The resulting environmental damage has contributed to the trend of deteriorating climate with frequent droughts, loss of crops and the resulting food shortage. Of the 167 woredas in the region, 48 (35%) are drought-prone and chronically food-insecure where Productive Safety Net Program /PSNP/ has been implemented that NRM projects were the main components of the program. Gubalafto Woreda is one of those woredas characterized by chronically food-insecurity and where PSNP-NRM projects have been implemented (Berhanu, 2013).

PSNP went through phase I to phase III and currently it is in phase IV. Save the Children designed and piloted this program in Amhara region by applying the lessons learnt from former projects like Employment Generating Scheme/EGS/ project (1998-1999) which was pioneer for Food for Work/FFW/ in 2000 - 2002, which in turn was an initiative for relief to development /R2D/ in 2003-2004 and later grown to PSNP in 2005. Save the Children piloted and implemented the early two phases of PSNP from 2005 to 2011 by different names. It was called PSNP in 2005, and later from 2006 to 2011 it was named as Multi-Year Assistance Program /MYAP/. The program under

Save the Children phased out in 2011 and the local government took over and continued to implement the later phases starting from 2011/12. From 2011/12-2015, it was called PSNP Phase-III, and from 2016 to 2020 it has been called PSNP Phase-IV. Concerning the magnitude of PSNP-NRM projects, more than 75% of NRM activities have been supported directly or indirectly by PSNP in the study area. The reaming 25% of NRM activities were covered by GoE free mobilization, organization for Rehabilitation and Development in Amhara/ORDA/, and Amhara Forest Enterprise among others. Despite all the efforts, many of these NRM projects suffered from lack of sustainability (North Wollo Zone Finance and Economic Development Department /FEDD/, 2016).

The key factors affecting sustainability of natural resource management projects were manmade and natural calamities like extraction and depletion/exploitation of natural resources, drought, population pressure, natural calamities like erratic rainfall, poor soil fertility, and frost that affect biological NRM projects; free grazing in conjugation with larger herbs compared with the carrying capacity of the land, affected both the biological and physical NRM projects; traditional farming practices, absence of alternative energy sources for rural community, and poverty severely. In many cases, lack of community participation followed by lack of ownership also had significant negative influences on both types of NRM projects (North Wollo Zone FEDD, 2009-2016).

Batey et al. (2008), recommended environmental protection and natural resource management without mentioning the importance of participation of the local community for sustainability of such projects. Though Save the Children has no its own policy of community participation in to its projects, it has good strategy on how to participate the community in line with the policies and procedures of government of Ethiopia. These policies are: Ethiopia Environmental and Climate Change policy (1997); property right of land in Constitution of Federal Democratic Republic of Ethiopia (1994) article 40(3); Constitution of the Federal Democratic Republic of Ethiopia Proclamation No. 89/1997 section 2(3)- Rural Land Administration; Poverty Reduction Strategy (2002); Land Management and Administration Policy of Ethiopia (2010); Federal Democratic Republic of Ethiopia, Ministry of Agriculture and Rural Development Investment Framework (2010) and Environment Policy of Ethiopia (1990).

This study tried to attempt to examine the effects of participation of local community in PCMs of Productive Safety Net Program /PSNP/-Natural Resource Management /NRM/ projects in Gubalafto Woreda, North Wollo zone, Amhara National Regional State/ANRS on sustainability of those projects, given other factors that affect sustainability of PSNP-NRM projects were taken for

granted. It investigated the cause & effect relationship of effective involvement of the local community in project initiation, planning, implementation, monitoring/evaluation and closing (i.e. project cycle management/PCM/) of PSNP-NRM projects and the sustainability of those NRM projects in the study Woreda. First, participation of the community at each stage of the project was collected separately and average was taken to represent PSNP-NRM projects in the analysis and interpretation processes. It contributed specific ideas and increased the stock of empirical knowledge about the effect of local community participation on sustainability of PSNP-NRM projects. It will also solve new/future and/or existing problems pertinent to effect of local community participation in PCMs of PSNP-NRM projects on their sustainability in Gubalafto Woreda. Therefore, the woreda, zone and the region will learn from the results of this research and duplicate to the other Kebeles of the woreda and other Woredas with relatively similar contexts in the implementation of recommendations.

1.2. Statement of the Problem

Sustainable development is the global issue. Environment is the universe of sustainability with especial focus in natural resources management. This has been evidenced in the 17 Sustainable Development Goals (SDGs) of the United Nations (2015). Sustainability of natural resources has been mentioned most of the goals. Combat climate change and sustainable management of biodiversity, water, forest and soil were core elements of the goals. According to factsheets of SDGs, thirteen million (13,000,000) hectares of forests are being lost every year; around 1.6 billion people depend on forests for their livelihood. Forests are home to more than 80% of all terrestrial species of animals, plants and insects; 2.6 billion people depend directly on agriculture, but 52% of the land used for agriculture is moderately or severely affected by soil degradation; due to drought and desertification each year, 12 million hectares have been lost where 20 million tons of grain could have been grown; of the 8,300 animal breeds known, 8% are extinct and 22% are at risk of extinction; as many as 80% of people living in rural areas in developing countries rely on traditional plant-based medicines for basic healthcare (United Nations, 2015).

There has been ample research on local community participation and sustainability of NRM projects worldwide and in Ethiopia. However, there was no research on the effect of community participation on sustainability in the context of PSNP-NRM projects. The focus of researches and reviews of PSNP reports were on effectiveness of financial services, social services, improvements in food security, effect of land tenure system on ownership of the rural community development practices, and in general, livelihood changes brought about by PSNP implementation. On the

PSNP-NRM projects, drought was mentioned as the cause for unattainability of them in lowland areas without assessing the level of participation in Project Cycle Managements (PCMs) of those projects and contribution of it to the sustainability of PSNP-NRM projects (Ministry of Agriculture, Disaster Risk Management and Food Security Coordination Directorate, 2013, Ethiopian Economic Policy Research Institute: Current land policy issues in Ethiopia, 1996 and Ethiopia Land Policy and Administration Assessment, 2004).

The previous governments (Derg regime) and its partners had initiated various soil and water conservation activities which were mostly unsatisfactory or failed because of lack of community participation, sector driven and single medium approach, unsecured land tenure, disincentives and unmanageable planning units. The existing government appears to have drawn lessons from the past shortcomings and then it had initiated participatory community-based watershed management that showed improvement from the previous system. It is believed that research and educational institutions needed to support it for further improvement (Chimdesa, 2016).

Concerning NGOs on the participatory and sustainable natural resource conservation in North Wollo Zone, they didn't address the power relationship problems between externals and the community to facilitate the community empowerment process through proper participation of the end users. The researcher recommended that there was a need for NGOs to raise the level of consciousness of the community about the importance of community participation and establishment of community based institutions at the community level in the form of association to facilitate the development activities in the locality by themselves without any external interventions (Mekonnen, 2007). This research however, lacked participation model against which community participation has been measured.

In the study of "The Sustainability of Community-Based Adaptation in the Choke Mountain Watersheds, Blue Nile Highlands, Ethiopia" on the 21 community based organizations/CBOs, total sustainability values ranged from 39% to 66%, with a median of 47%. No sustained CBO obtained a total sustainability score $\geq$ 70% (which would be an indicator of strong sustainability). Repeatedly occurring critical barriers to sustainability were inadequacies in community participation, absence of training for local community members, low commitment of local government, low capacity of farmers, and extended bureaucracy (Simane, 2013).

Contextual gap- according to Sharon (2014) and Elizabeth (2002), it is a research gap in relation to everything that impacts on how we create and use knowledge, which includes organizational

culture 'way things are done', resources, tools, systems, processes, leadership and governance influenced by power, politics, and policy. There was a gap between donors, implementers and policy makers in practicing the participatory NRM policy, in fitting the policy in to the existing institutional arrangements and capacities to bring about sustainable NRM practices. Understanding level and methodology of implementation of the participation theory is subjective to organizations and individuals.

Moreover, implementers at grassroots level and the community members understood sustainability in a very crude, conventional and general terms than viewing it scientifically in its three dimensions: environmental sustainability, economic sustainability, and social sustainability that would give the clear picture of this very important development variable.

Methodological gap- almost all research reports reviewed employed qualitative approaches, which provided insights into the setting of a problem. According to John (2014), "qualitative research is considered particularly suitable for gaining an in-depth understanding of underlying reasons and motivations and generate ideas for quantitative researches. Quantitative research on the other hand allows generalizations of results from a sample to an entire population. This implied that applying quantitative research on local community participation and sustainability of PSNP-NRM projects is very useful to infer the results to the wider population of the study.

1.3. Research Questions

1. What do the participations of local community in the project cycle management/PCM/ of PSNP-NRM projects in Gubalafto Woreda look like?
2. What do the practices of issues of sustainability of the PSNP-NRM projects in Gubalafto Woreda look like?
3. What is the effect of local community participation on the sustainability of PSNP-NRM projects in Gubalafto Woreda?

1.4. Research Objectives

The general objective of this study was to assess the effect of the local community participation in PSNP-NRM projects on their sustainability in Gubalafto Woreda of North Wollo Zone in ANRS with focus of analyzing the cause & effect relationship of the two important development project variables: participation and sustainability within the specified projects in the program.

Specific objectives: -

1. To assess the extents of local community participation in the PCM of PSNP-NRM projects of Gubalafto Woreda.

2. To analyze the practices of issues of sustainability of PSNP-NRM projects in Gubalafto Woreda.

3. To examine the effect of the local community participation on the sustainability of PSNP-NRM projects in Gubalafto Woreda.

1.5. Hypothesis of the Study

Null Hypothesis/H0/: -local community participation in project cycle management of PSNP-NRM projects does not have significant effect on the sustainability of the projects Hypothesis 1/H1/: - local community participation in project cycle management of PSNP-NRM projects has significant effect on the sustainability of the projects

1.6. Significance of the Study

Implication to Business Organizations: - It has become a common saying that environmental problems are substantial, and that economic growth contributes to them. A common response is stricter environmental regulation, which often inhibits growth. The result can be a trade-off between a healthy environment on the one hand and healthy growth on the other. As a consequence, opportunities for business may be constrained. However, there are some forms of development that are both environmentally and socially sustainable. They lead not to a trade-off but to an improved environment, together with development that does not draw down our environmental capital. This is what sustainable development is all about - a revolutionary change in the way we approach these issues. Businesses and societies can find approaches that will move towards all three goals - environmental protection, social wellbeing and economic development at the same time. Sustainable development is good business in itself. It creates opportunities for suppliers of 'green consumers', developers of environmentally safer materials and processes, firms that invest in eco-efficiency, and those that engage themselves in social well-being. These enterprises will generally have a competitive advantage. They will earn their local community's goodwill and see their efforts reflected in the bottom line (Business Strategy for Sustainable Development, 1992).

Social responsibility, therefore is one of the requirements of any business project. To meet this requirement one criteria among others is sustainable environmental protection. Referring the result

of this research would help those organizations to take important considerations about the relationship of community participation to sustainable environmental development and environmental protection projects during their business strategy development in which sustainable economic growth and social well-being will be actualized.

Implications for Local Community: -Sustainability of natural resource projects have been an issue in ANRS in general and in north Wollo zone of Gubalafto Woreda in particular. The researcher assumed that local community participation had vital role for this. It was also assumed that the two development variables i.e. participation and sustainability would have positive relationships and went for proving the assumption through this research. This study tried to identify the effects of levels/types of participation of the local community in PCMs of PSNP-NRM projects on sustainability of those projects and recommended best ways on how the local community participation could be enhanced towards benefiting from the sustainable development of those projects.

Implications for Implementing Agencies: This study tried to fix the methodological and contextual gaps of earlier researches that brought into view the effect of local community participation on sustainability of natural resource management projects under PSNP in the study area. In addition, it tried to contribute to enhance existing efforts in implementing PSNP projects in the locality in participatory ways that in turn to contribute to sustainability of the PSNP-NRM projects. As a result, the study tried to show gaps and provide recommendations on best practices for implementing agencies on the effects of levels of participation in project phases /PCM/ and sustainability of PSNP-NRM projects that further would help in involving the local community to contribute for sustainability of those projects now and in the future.

Implications for Decision Makers: The study answered management questions related to the importance of the local community participation in PCMs for sustainability of PSNP-NRM projects. It also allowed the management bodies of such projects in different organizations to understand in depth about the necessity of active participation of local community for the sustainable development and utilization of PSNP-NRM projects. Besides, this research tried to add new knowledge to the existing literature for proper decision making by the management bodies in involving the local community to ensure sustainability of PSNP-NRM projects in the study area in particular, and in Amhara regional and at country level in general. It also would contribute to policy makers to improve the NRM policies and procedures towards enhancing local community

participation to best complement for sustainability of PSNP-NRM projects and/or management of natal environment as well as climate change in the country at large.

Implications for NGOs: This study could be used in proposal writing and fund raising activities of local and international NGOs in the process of designing participatory and sustainable NRM related projects. Besides, during implementation, this study results will be used to ensure true participation of the local community that in turn will help in contributing for sustainability.

1.7. Scope and Limitations of the Study

1.6.1 Scope of the Study

Geographical Scope: Gubalafto is one of the nine rural woredas of North Wollo zone in the eastern part of Amhara region and it has 38 *kebeles*. This study was conducted in six sample *kebeles* of Gubalafto woreda which accounted about 16% of the total *kebeles* of the woreda.

Topical Scope: The sustainability of NRM projects could be affected by several manmade and natural factors including: extents/levels of participation, amount and intensity of rainfall, soil fertility, population pressure, free grazing, poverty, level of knowledge of the community, infrastructure, and unavailability of energy substitutes. This study was delimited to investigate the effect of local community participation in PSNP-NRM projects and the sustainability of those projects by assuming other factors are taken for granted.

Methodological Scope: This study employed mixed research methods (qualitative and quantitative methods) with tools like desk review, interview of key informants and the use of questionnaire for data collection from sampled respondents. Under inferential statistics, causal research design and ordered logistic regression statistical data analysis model were applied. This was because the data collected for this research on sustainability and participation were in the form of Likert-Scale measurement, which consisted of environmental, economic and social sustainability dimensions that could have any value between 1 and 5 where 1 representing the lowest value standing for "strongly disagree" and 5 representing the highest value standing for "strongly agree" in the Likert-Scale measurement which satisfied all the requirements of study variables: participation and sustainability of PSNP-NRM projects (Geraghty 2014 and University of South California Libraries, 2016).

Time Scope: Though NRM projects have long history, the researcher focused on PSNP-NRM projects only and the period covered 2005 to 2017.

1.6.2 Limitations of the Study

There were many urgencies and unplanned emergency activities in government and NGO offices that challenged the intended data collection processes especially, the interview sessions. Moreover, the period of the data collection coincided with *meher* and *belg* season agricultural activities for agrarian areas, where the study area is one. As a result, farmers engaged in agricultural activities and was difficult to get the sampled respondents (especially those under public work category) to complete the questionnaire as planned.

The researcher overcame this challenge by assigning quite enough time for decision makers of both Gubalafto Woreda Agriculture Office and Save the Children Woldia Field Office, and put flexible plan to meet officials and experts for interview in response to urgencies with respondents. In regards to involving respondents of PSNP-LBPW, the primarily plan to meet them was on non-working days. Still defaulters were exhibited because of other priorities like market and social events and the researcher had a very flexible schedule to accommodate the time issue of the respondents. Whenever the sampled respondents had still tight schedules to get involved in the study, the researcher was obliged to see the other option, i.e. taking the next household from the sampled household in the master list. In avoiding problems arising from data collection by field assistants or enumerators, they took two days theoretical and practical /simulation/ training on how they could collect the required data, the content of the questionnaire, expected challenges and suggested solutions, follow up, reporting, reviewing data, providing comments and addressing comments were processes and procedures implemented. Furthermore, in ensuring proper data collection by the enumerators, among others the following activates were carried out: testing the questionnaire, monitoring data collection process by the researcher, day-to-day review of the completed questionnaire and timely feedback to data collectors. Presumably, these actions minimized and/or eliminated the risks of data quality significantly.

on top of this, the data is ordinal scale using a 5-point Likert Scale measurement which respondents' responses ranged between "strongly disagree" represented by "1" to "strongly agree" represented by "5". The research therefore was not objectively measured the effect of participation on sustainability, rather it has subjectivity that a respondents' response might vary for the same context of participation and sustainability statuses that future researches need to pay attention to this gap as well.

1.8. Organization of the Research Report

This research report consisted of five chapters. Chapter-one as described above, was introductory. Chapter two presented the review of relevant literatures, which consists of both the researcher's review of empirical studies and theoretical framework that has been applied in conducting this study. Chapter three dealt with the methodological framework of the study that describes the research design, data collection tools, and methods of data analysis and interpretation. Chapter four dealt with the data analysis and interpretation, and chapter-five dealt with findings, conclusion and recommendation components of this study.

1.9. Operational Definition of Terms

The researcher made operational definitions for some key concepts and terms used in this research report to avoid ambiguities or confusions among readers.

Community: A collection of households who live in close geographical proximity such as a ward/district and commune/villages with one another **(**FAO, 1989).

Local Community participation: The process by which individuals, families, and rural communities in Gubalafto Woreda can organize themselves and, through their organization, are able to identify their own needs/problems, share in the project design, implementation, monitoring, evaluation and closing of PSNP-NRM projects in the participatory action (FAO, 1989).

PSNP-NRM Projects: it includes Natural Resource Management components of Productive Safety Net Program like soil and water conservation, nursery management, forage/fodder development, gulley treatment, area closure, watershed management, potable water development, irrigation scheme development, rural roads catchment management, and rain water harvesting (PSNP Program Implementation Manual /PIM/, 2014).

Sustainability: is the physical development and institutional operating practices that meet the needs of present users without compromising the ability of future generations to meet their own needs, particularly with regard to use and waste of natural resources in respect to the three dimensions: environmental, economic and social sustainability (University of California, Los Angeles /UCLA/ Sustainability Committee, 2014).

Sustainability of PSNP-NRM Projects: is the ability of implemented PSNP-NRM projects like soil and water conservation, nursery management, forage/fodder development, gulley treatment, area closure, watershed management, potable water development, irrigation scheme development,

rural roads catchment management, and rain water harvesting, etc. to satisfy the conditions of sustainability and to ensure endurance and healthy environment beyond the project period (PSNP PIM, 2010).

Biological PSNP-NRM Projects: are PSNP projects that are related to the development and utilization of biotic projects /afforestation/plantation/ that included biological SWC, forage development, nursery management, area closure, watershed management, gulley treatment, irrigation scheme development, and rural roads catchment management (PSNP-PIM 2010; UN World Chapter for Nature, 1982).

Physical PSNP-NRM projects: are PSNP projects, which are related to abiotic projects like physical soil and water conservations, rain water harvesting, potable water development, etc. (PSNP-PIM 2010, UN World Chapter for Nature 1982).

CHAPTER II: REVIEW OF RELATED LITERATURE

2.1. Theoretical Literature Review

2.1.1. Terms and Concepts

The researcher reviewed literatures related to NRM projects, community participation in such projects and sustainability issues. Key concepts are defined as follows.

2.1.1.1. Natural Resource Management Related Terms and Concepts

Natural resources are those resources, which are not manmade but available naturally. There are many classifications of natural resources. Among these are biotic and abiotic; potential, reserve and stock; renewable and non-renewable natural resources. Biotic natural resources are obtained from the biosphere (living and organic material), such as forests and animals, and the materials that can be obtained from them. Fossil fuels such as coal and petroleum are also included in this category because they are formed from decayed organic matter and Abiotic resources are those that come from non-living, non-organic material. Examples of abiotic resources include land, fresh water, air and heavy metals including ores such as gold, iron, copper, silver, etc. Considering their stage of development, natural resources may be referred potential natural resources which exist in a region and may be used in the future. For example, petroleum occurs with sedimentary rocks in various regions, but until the time it is actually drilled out and put into use, it remains a potential resource whereas reserve natural resources are part of an actual resource which can be developed profitably in the future and stock natural resources are those that have been surveyed but cannot be used by organisms' due to lack of technology, for example: hydrogen. Renewable natural resources can be replenished naturally. Some of these resources, like sunlight, air, wind, etc., are continuously available and their quantity is not noticeably affected by human consumption whereas non-renewable natural resources: either form slowly or do not naturally form in the environment. Minerals are the most common resource included in this category. However, there are different forms of distractions. Extraction of natural resources involve any activity that withdraws resources from nature. This can range in scale from the traditional use of preindustrial societies, to global industry. Extractive industries are, along with agriculture, the basis of the primary sector of the economy. Depletion of NRM is the ability to degrade current environments and potential to impact the needs of future generations and concern for sustainable development Natural resource management is, therefore, wise use of natural resources through

protection of depletion and the application of replacement for what is used. Environmental protection measures need to be taken at all societal levels, from international to individual, to protect nature for sustainable use of natural resources and suggests that the protection of resources should be incorporated into national and international systems of law (Batey et al., 2008 and UN World Chapter for Nature, 1982).

2.1.1.2. Participation Related Terms and Concepts

Participation: Often the term participation is modified with adjectives such as community participation, citizen participation, people's participation, public participation, and popular participation. The Oxford English Dictionary defines participation as "to have a share in" or "to take part in," thereby emphasizing the rights of individuals and the choices that they make in order to participate. Arnstein (1969) states that the idea of citizen participation is a little like eating spinach: no one is against it in principle because it is good for you. The other most peered definition for this study is Westergaard's (1986) definition of participation as "collective efforts to increase and exercise control over resources and institutions on the part of groups and movements of those up until then excluded from control."

Community Participation: The process by which the rural poor can organize themselves and, through their organization, are able to identify their own needs, share in the design, implementation and evaluation of the participatory action (FAO, 1989).

Levels of Participation: According to Pretty (1995), the guide proposes a seven-rung ladder of participation which relates to the stance an organization promoting participation may take:

Manipulative Participation-Participation is simply a pretense, with people's representatives on official boards who are unelected and have no power.

Passive Participation- People participate by being told what is going to happen or what has already happened.

Participation by consultation- People participate by being consulted, or by answering questions. External agents define both problems and information- gathering processes, and so control analysis.

Participation for material incentives- People participate by providing resources, for example labor in return for food, cash or other material incentives.

Functional participation- Participation seen by external agencies as a means to achieve project goals, especially reduced costs.

Interactive participation- People participate in joint analysis, development of action plans and formation or strengthening of local institutions.

Self-mobilization- People participate by taking initiatives to change systems independently of external institutions.

2.1.1.3. Sustainability Related Terms and Concepts

Sustainability: The most often quoted definition comes from the UN World Commission on Environment and Development: "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." In the charter for the UCLA Sustainability Committee, sustainability is defined as: "the physical development and institutional operating practices that meet the needs of present users without compromising the ability of future generations to meet their own needs, particularly with regard to use and waste of natural resources. Sustainable practices support ecological, human, and economic health and vitality. Sustainability presumes that resources are finite, and should be used conservatively and wisely with a view to long-term priorities and consequences of the ways in which resources are used." In simplest terms, sustainability is about our children and our grandchildren, and the world we will leave them (UCLA Sustainability Committee, 2014).

Sustainable Development-a Business Definition: "For the business enterprise, sustainable development means adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future." This definition captures the spirit of the concept as originally proposed by the World Commission on Environment and Development, and recognizes that economic development must meet the needs of a business enterprise and its stakeholders. The latter include shareholders, lenders, customers, employees, suppliers and communities who are affected by the organization's activities. It also highlights business's dependence on human and natural resources, in addition to physical and financial capital. It emphasizes that economic activity must not irreparably degrade or destroy these natural and human resources. It also highlights business's dependence on human and natural resources, in addition to physical and financial capital. It emphasizes that economic activity must not irreparably degrade or destroy these natural and human resources. This definition is intended to help business directors apply the concept of

sustainable development to their own organizations. However, it is important to emphasize that sustainable development cannot be achieved by a single enterprise (or, for that matter, by the entire business community) in isolation. Sustainable development is a pervasive philosophy to which every participant in the global economy (including consumers and government) must subscribe, if we are to meet today's needs without compromising the ability of future generations to meet their own. Protecting an organization's capital base is a well-accepted business principle. Yet organizations do not generally recognize the possibility of extending this notion to the world's natural and human resources (Business Strategy for Sustainable Development, 1992).

Environmental sustainability: The ability of the environmental system of the given area to meet the needs of the present users without affecting the needs of future generation. The maintenance of the factors and practices that contribute to the quality of environment on a long-term basis (Donald, Sep, 1961).

Economic Sustainability: The ability of the economic system of the given area to meet the needs of the present users without affecting the needs of future generation. The use of various strategies for employing existing resources optimally so that a responsible and beneficial balance can be achieved over the longer term. Within a business context, economic sustainability involves using the assorted assets of the company efficiently to allow it to continue functioning profitability over time (Donald, Sep, 1961).

Social Sustainability: The ability of the social system of the given area to meet the needs of the present users without affecting the needs of future generation. It presents a threefold schema comprising: (a) 'development sustainability' addressing basic needs, the creation of social capital, justice and so on; (b) 'bridge sustainability' concerning changes in behavior so as to achieve bio-physical environmental goals and; (c) 'maintenance sustainability' referring to the preservation – or what can be sustained – of socio-cultural characteristics in the face of change, and the ways in which people actively embrace or resist those changes. This tripartite of social sustainability is used to explore ways in which contradictions and complements between them impede or promote sustainable development, and draw upon housing in urban areas as a means of explicating these ideas (Donald, Sep, 1961).

2.1.1.4. Project & Program Related Terms and Concepts

Project: a project is a temporary endeavor undertaken to create a unique product, service, or result. Temporary means that every project has a definite beginning and a definite end. Unique means that the product or service is different in some distinguishing way from all other products or

services. Project, therefore is characterized by set of non-routine activities to be accomplished within specified period, with limited resources to achieve set of specific objectives (PMI-PMBOK, 2013).

Project Cycle /Project Phase/: Because projects are unique undertakings, they involve a degree of uncertainty. Organizations performing projects will usually divide each project into several project phases to improve management control and provide for links to the ongoing operations of the performing organization. Collectively, the project phases are known as the project life cycle (PMI-PMBOK, 2013).

Table 2.1: PMI-PMBOK (2013) Project Management Framework

The 47 PMBOK Project Management Processes											
		PMBOK Areas									
Project Phase/Cycle	Process Group	Integration	Scope	Time	Cost	Quality	Human Resource	Communication	Risk	Procurement	Stakeholder	Sum of Processes
Initiation	Initiating	1									1	2
Planning	Planning	1	4	6	3	1	1	1	5	1	1	24
Execution	Exciting	1				1	3	1		1	1	8
	Monitoring & Controlling	2	2	1	1	1			1	1	1	11
Close-out	Closing	1									1	2
Sum of Processes		6	6	7	4	3	4	3	6	4	4	47

NB: Numbers in the table imply the number of processes under each PMBOK Area and across each project cycle/phase and process group.

Each project phase is marked by completion of one or more deliverables. A deliverable is a tangible, verifiable work product such as a feasibility study, a detail design, or a working prototype. The deliverables, and hence the phases, are part of a generally sequential logic designed to ensure proper definition of the product of the project. The conclusion of a project phase is generally marked by a review of both key deliverables and project performance to date, to a) determine if the project should continue into its next phase and b) detect and correct errors cost effectively. These phase-end reviews are often called phase exits, stage gates, or kill points.

Project Cycle Management / Project Management/: According to PMI-PMBOK (2013), it is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements. Project management is accomplished with the processes such as initiating, planning, executing, controlling, and closing. The project team manages the work of the projects, and the work typically involves:

i.   competing demands for scope, time, cost, risk, and quality

ii.   stakeholders with definite needs and expectations

iii.   identified requirements

Program: is a group of projects managed in a coordinated way to obtain benefits not available from managing them individually (PMI-PMBOK, 2013). In the case of this study PSNP is a program composed of many projects, at least some if not all of them are implemented together to benefit the community through contributing to ensure food security. Tree nursery management projects alone, for example, has nothing to do without biological SWC, catchment development and other plantation/afforestation/ projects.

Productive Safety Net Program/PSNP/: is a program, which transfers food/cash ration to food insecure populations in a way, which prevents asset depletion at the household level, creates assets at the community level and stimulates markets. PSNP has five main elements that combine to achieve the PSNP objectives. These are "food/cash transfers for chronically food insecure households (conditional transfers and   unconditional transfers); food/cash transfers for households affected by shocks; public works to create sustainable infrastructure; strengthening the effectiveness of PSNP implementation and coordination between program implementers and with other development and relief efforts". According to the PSNP-PIM 2010, PSNP has three major objectives:

i.   Food consumption assured and asset depletion prevented for food insecure households,

ii.   Markets stimulated and access to services and natural resources enhanced for PSNP and other households,

iii.   Natural environment rehabilitated and enhanced.

Sustainability of outcomes within objective two and three above and output three below were the focus of this study in aspects of the cause- and-effect relation of local community participation on PCMs of PSNP-NRM Projects and the sustainability's of them. According to the PSNP IV-PIM revised in 2014, PSNP has the following four outputs that will contribute to the four outcomes.

i.   Appropriate, timely and predictable transfers (cash and/or food) received by households in response to chronic requirements.

ii.   Transitory cash and food needs addressed effectively in PSNP woredas, to the limit of risk financing resources.

iii.   Quality, new and existing, community assets with operational management mechanisms established

iv.   Coordination, complementarity and synergy promoted within government systems and with other relevant program and organizations.

2.1.2. Models of Participation and Sustainability

There have been numerous ways of representing participation and sustainability in models that encapsulate these extremely complex development concepts and a new way of thinking. This section was an attempt to briefly capture some of these efforts on the major features of any modelling that would be in a position to properly reflect the sense of participation and sustainability.

2.1.2.1. Models of Participation

There were many models of participation that the researcher reviewed to identify the best one for this research from the alternatives. To highlight some of the reviewed models: "top-down model" which illustrates absence of community participation and as the result community developed dependency and laziness; "partnership model" which depicts three levels of community participation for which partnership is the highest; "eight rungs on the ladder of citizen participation" which represents participation with an ordinary ladder with eight stairs/steps, the bottom representing poor participation called manipulation and the top representing best participation termed as citizen control and "White's typology of interests" model describes participation in five levels from nominal as lower level of participation to transformative as highest level. Several of these models reviewed by researcher had many similarities except the fact that some models were more detailed as compared to others. However, "the top down participation model" was quite different from others which is characterized by zero participation (Narayana, 2002; Arnstein, 1969; Hashabeng, 2002).

The researcher finally selected "Pretty's typology of participation" model for this research. It has been selected due to the fact that the terminologies were easy and familiar to interpret for any reader of this paper and participation level of the local community in PCMs of PSNP-NRM projects fitted and evaluated against this participation model. The researcher illustrated the stages of "Pretty's typology of participation model" and their corresponding futures in figure 1 below.

Typology	Characteristics of each type participation
1. Manipulative participation	Participation is simply a pretense, with people's representatives on official boards who are unelected and have no power.
2. Passive Participation	People participate by being told what is going to happen or what has already happened. This involves unilateral announcement by an administration or by project management without listening to people's responses. The information being shared belongs only to external professionals.
3.Participation by consultation	People participate by being consulted, or by answering questions. External agents define both problems and information- gathering processes, and so control analysis. Such a consultative process does not concede any share in decision making and professionals are under no obligation to take on board people's views
4. Participation for material incentives	People participate by providing resources, for example labor in return for food, cash or other material incentives. Farmers may provide the fields and labor, but are involved in neither experimentation nor the process of learning. It is very common to find this called participation, yet people have no stake in prolonging technologies or practices when the incentives end.
5. Functional participation	Participation seen by external agencies as a means to achieve project goals, especially reduced costs. People may participate by forming groups to meet predetermined objectives related to the project. Such involvement may be interactive and involve shared decision making, but tends to arise only after major decisions have already been made by external agents. At worst, local people may still only be invited to serve external goals.
6. Interactive participation	People participate in joint analysis, development of action plans and formation or strengthening of local institutions. Participation is seen as a right, not just the means to achieve projects goals. The process involves interdisciplinary methodologies that seek multiple perspectives and make use of systematic and structured learning processes. As groups take control over local decisions and determine how available resources are used, so they have a stake in maintaining structures or practices
7. Self-mobilization	People participate by taking initiatives to change systems independently of external institutions. They develop contacts with external institutions for the resources and technical advice they need, but retain control over how resources are used. Self-mobilization can spread if governments and NGOs provide an enabling framework of support. Such self-initiated mobilization may or may not challenge existing distributions of wealth and power.

Fig 2.1: Pretty's typology of participation

Source: Pretty (1995)

From fig.1, one could understand that the first two participation typologies do not have lasting effects on development programs or projects and considered as non-participatory typologies of the model. The 3rd and 4th levels have little rooms to participate the community in projects phases in terms of extracting people's ideas to meet objectives of externals and little contributions for sustainable development. These typologies still lack involvement of the community in decision making. This was because they involve no more than telling what is going to happen or requiring responses to some questions where the local people respond and contribute in terms of labor for food or cash. This in fact is to ensure that local community participations go in line with donors' action plans and the project objectives. On the other hand, the last three participation typologies

commit genuine community participations progressively from 5th to 7th levels of participation in which local people actively involves in decision-making, implementation of activities affecting their lives, and also sharing the benefits. As one moves from the fifth typology of participation down to the last typology (i.e. from functional participation through interactive participation and self-mobilization), the effects of participation on sustainability of PSNP-NRM projects were expected to be increased progressively. The last level of participation (self-mobilization) is the most ideal level of participation that tends to bring the most positive lasting effects. Thus, one has to be cautious in using and interpreting levels of community participation in projects, and make proper reference to the type of participation because most of them (typology 1-4) threaten the goals of projects or programs rather than promoting them (Pretty 1995, Tadesse 2014).

2.1.2.2. Models of Sustainability

Like models for participation, there were several models for sustainability and reviewing those models helped the researcher to identify the best fit sustainability model for this specific research among others. Some of the reviewed models were the three-legged stool or three pillars of sustainability model, which describes sustainability as a function of ecological, economic, and social sustainability in a balanced manner as the stands of the stool used to be equal to stand and serve the purpose properly. If social system and economic sustainability could be maintained, there would be equity and the concurrent prevalence of environmental sustainability would bring about viability. In addition, if the social system and the environment have been made sustainable, bearable conditions would be created and the existing together of the three-pillars of sustainability would ensure success in achieving the desired objectives. However, meeting all the pillars at the same time is the biggest challenge in today's world (Kibert et al., 2004; Silvius et al. 2010).

Viewing in the context of PSNP-NRM projects' sustainability, the Venn Diagram Model of Sustainability has been shown below with some communality between environmental, economic and social sustainability.
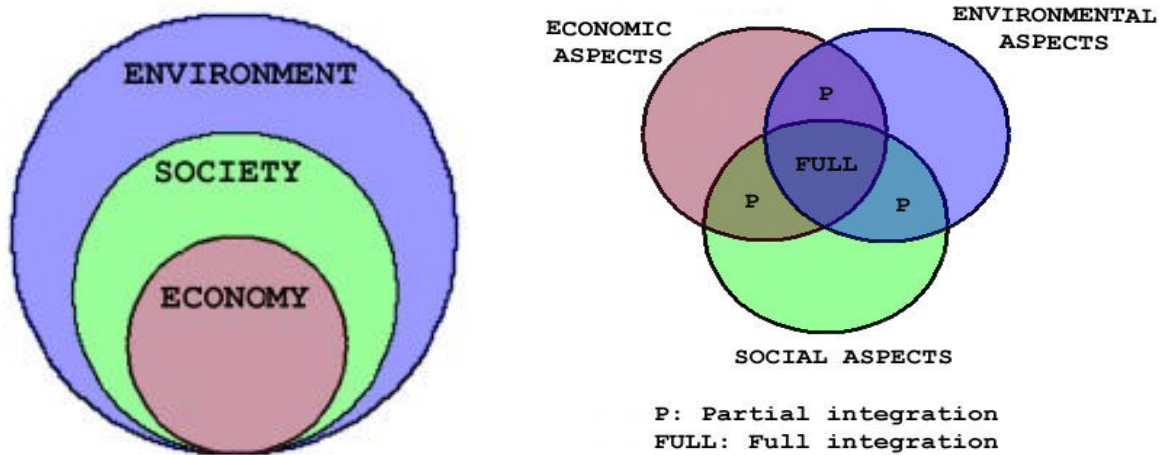
Fig 2.2: Sustainability Model Representation Using Non-concentric circles (left) and Using a Venn Diagram (right)
Source: Rodrigo Lozano (2008)

The Venn diagram model of sustainability shown above depicts that environment as component of sustainability encompasses all the other elements (society and economy) while the societal dimension encompasses economy. The efforts made on environment are enormously needed to ensure sustainability given that all components should be met equally and simultaneously to ensure actual sustainability. This model of sustainability is also termed as pictorial visualization model and is elaborated as follows. The three dimensions of sustainability such as economic, social, and environmental, are represented either as pillars, embedded circles, or in the popular Venn diagram of three overlapping circles. The latter model stresses the importance of the intersection between the three areas (see Figure 4). Generally, these are popular static models with limited informative value, but powerful in terms of reaching abroad audience.
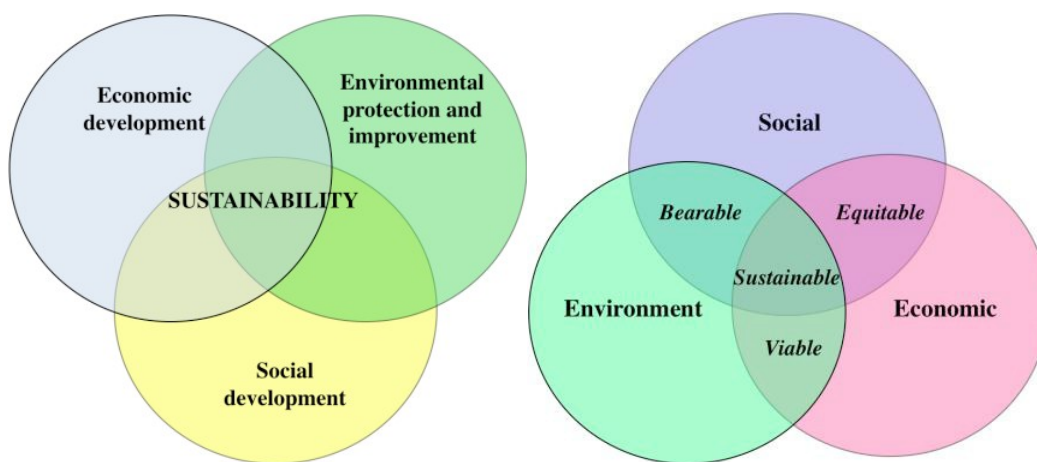
Fig 2.3: Venn Diagram Model of Sustainability
Source: Newman and Kenworthy (1999)

Like the participation models, all the sustainability models are interlinked and built up on one over the other. The researcher used the Venn diagram model for this study because it is relevant to develop research/conceptual framework that explained the research questions this study aimed to answer. Besides, the model interlinking the dimensions of sustainability could best describe the nature and benefits of PSNP-NRM projects in the community. In fact, one dimension of sustainability will not exist independently without the other in the course of PSNP-NRM projects implementation.

2.2. Empirical Literature Review

A research has been made on "The Sustainability of Community-Based Adaptation in the Choke Mountain Watersheds, Blue Nile Highlands, Ethiopia." The researcher used qualitative and quantitative approach, analytical hierarchy process, descriptive analysis, cross-sectional model as a methodology of the study to assess sustainability of CBOs working in NRM practices due to the implementation of "Participatory Community-Based Approach". The finding was that only 28.6% of the CBOs working in NRM were sustained by social, environmental, institutional, financial and technical diminutions of sustainability (71.4% of CBOs were not sustained) and so the NRM projects. The researcher recommended that community participation at designing phase was poor and should be enhanced in the upcoming project designing phases (Simane, 2013).

Chimdesa (2016), conducted a study on "Historical Perspectives and Present Scenarios of Watershed Management in Ethiopia." Qualitative research approach (review of research reports, periodic reports and polices) and descriptive analysis was used as a method. The independent variable was "Previous (before 1991) and Current (since 1991) Practices of watershed" to see its effect on sustainability of the current watershed management. The result of the research was that Current practices are more useful (more participatory) on watershed sustainability than the previous ones characterized by lack of community participation, ignoring indigenous knowledge, land tenure insecurity, disincentives and unmanageable planning units. The researcher recommended that watershed management was aimed to address the root causes of the NRM problems. However, it doesn't mean that current watershed management practices are perfect, but practically there are various problems that will be solved in the future. To ensure watershed management sustainability in Ethiopia, both biophysical and socio-economic characteristics and the upstream-downstream linkage of the watershed should be considered. Any

interventions aimed to implement in a watershed should be in an integrated, flexible, multi-sectoral and multi-disciplinary approach; both scientific and indigenous knowledge should be equally paid attention; strengthening awareness creation, capacity building, real community participation and equitable benefit sharing are also requiring attention. In general, the effectiveness of watershed management practices must be evaluated in terms of environmental soundness, economic viability and social acceptability. Besides, they should be supported by research and educational institutions.

Another research was conducted on the "Impacts and Impediments of Community Participation on Soil & Water Conservation to Sustainable Land Resource Management in Laelay Maychew Wereda, Tigray, Ethiopia." The methodology was the use of random sampling (for the selection of both study area and respondents), quantitative research approach and descriptive analysis to see effect of participation on sustainability of land use management. The finding was that when active community participation is exercised, sustainable land use management enhanced. There have been many factors that affect community participation in soil and water conservations. Some of them were wealth level, age level, health level, educational level, information level, technology level, cultural values, transportation level and land tenure system. In addition to these, lack of initiatives and support and cultural values were other factors that affected community participation. Males and females were not participating equally. The nature of the work and work load on females were the factors that affected their participation that has an influence on the sustainability of those NRM projects. Deforestation was the major environmental problem in the study areas. Sustainability of NRM projects was an issue in the study area. An intensive afforestation and reforestation program with active involvement of the people was also important. Community by-law formulated by the active participation of the people themselves enhanced the sustainable use forests. In order to improve the level of participation, the appropriateness of conservation measure practiced should be tested and accepted by all stakeholders, especially by end users (Tadesse, 2014).

The study on "The Impact of the Joint Program in North Wollo, Ethiopia: Enhanced Food Security and Livelihood Sustainability for the Poor", applying purposive sampling (for both study area and respondents); qualitative approach (review of secondary data) and quantitative approach (interview of households); and descriptive analysis were used for the study. The variables were "Joint Program Implementations" (independent) and "Food Security and Livelihood Sustainability for the Poor (dependent)". The finding was that joint program implementation between NGOs and GoE in

North Wollo Zone brought positive changes on food security and livelihood sustainability for the poor (Sorense et al.,2004).

In relation to concepts of empowerment for Natural Resource Conservation, Zenebe Mekonnen (2007), conducted a study on the "Roles of NGOs in Community Empowerment for Natural Resource Conservation: A case study of two NGOs in North Wollo, Ethiopia". Employing a qualitative method and purposive sampling, and offered descriptive analysis of the effects of community empowerment on natural resource conservation. Findings of the study further indicated that the two variables were positively related. However, the changes on the independent and dependent variables were inadequate, i.e. there were little efforts to enhance community empowerment for conservation activities and their sustainability were unsatisfactory.

Elizabeth (2002) conducted a study on "The Problem with the Locals: Partnership and Participation in Ethiopia". The researcher applied qualitative method with purposive sampling and descriptive analysis of data. The focus of the study was to see the relation of "Local Community Partnership and Participation" and "Sustainability of NRM projects". Findings of this study showed that the independent & dependent variables were positively related implying that there were gaps between policy and practice.

The major PSNP-NRM projects implemented in Gubalafto Woreda were soil and water conservation (SWC), nursery management, watershed management, fodder/forage plantation and management, area closure, rain water harvesting and management, irrigation scheme development and management, potable water development and management and rural roads catchment management where this research focused (North Wollo Zone Finance and Economic Development Department/FEDD/, 2010).

2.3. Synthesis of Literature Review

2.3.1. Major Findings of the Review

In response to the findings of the literatures reviewed, the researcher tried to answer the following important questions.

What was already known about the research problem? –Researches reviewed underlined that participation and sustainability have still been very complex development variables known by name only in the study areas: at decision makers level, implementers level, and community/end-users level. Besides, community participation is still in its infant stage in that the exercise is either

due to existence of payments to cover food gaps of the household (mainly in PSNP) or due to fear of administrative actions like denying social services (credit, oil, sugar, etc.), due to absenteeism in community mobilization works. Sustainability of natural resources were also questioned by researches reviewed so far but the reasons were natural hazards, poverty, absence of alternative energy sources, overgrazing, constructions and the like with little attention to community participation (Tadesse, 2014; Simane,2013 and Mekonnen, 2007).

What were the gaps in the present body of knowledge? –the researcher realized that there have been methodological and contextual gaps in assessing and analyzing relationships between community participation and sustainability of NRM practices. There were gaps in the adaption, contextualization and application of the theoretical knowledge in to development programs in general and in PSNP-NRM projects in particular. Manipulative, passive, consultative and material incentive participations were taken as participations where true participation could be characterized by functional, interactive and/or self-mobilization levels. Sustainability assessments were also focused mostly on environmental stainability by giving less attention to economic and social sustainability. In natural fact, however, the three pillars have to go hand-in-hand during any research. Let alone one of the pillars, the existence of the two pillars together will never guaranty sustainability at all, rather, existence of each two resulted in either equitability (social-economic), or viability (economic-environment) or bearable (environment-social), for sustainability to happen, the three pillars come to exist at the same time. Methodological gap was in that most empirical researches reviewed focused on the descriptive statistic and qualitative approach, results and findings could not be used to infer to other areas. Quantitative approach or mixed approach were rarely used in the subject in general and in geographic area of this study in particular (Tadesse, 2014; Simane, 2013 and Mekonnen, 2007).

Where and how did the research fit into this picture? -this research was able be fitted to fill gaps of other studies in the area: the methodological gaps by applying mixed research approach and contextual and conceptual gaps by putting clear and brief findings and recommendations regarding how true local participation will be realized in PCMs to ensure environmental, economic and social sustainability of PSNP-NRM projects.

What contribution did research make to the existing academic knowledge base and how did it enrich current practices? –implementers of PSNP-NRM projects and the community could be benefited from this research in that the results of the study could contribute in providing workable, problem solving, locally applicable, easily adaptable and practical recommendations for further

improving the effect of local community participation in PCMs of PSNP-NRM projects on sustainability of them.

2.3.2. Conceptual Framework

The researcher developed the below conceptual framework from the reviewed theoretical and empirical literatures. It was the skeleton of the whole study that allowed the researcher to make links between the analyzed empirical data of the effect of local community participation in PCMs of PSNP-NRM projects on the sustainability of them with the reviewed literatures' theories and concepts of the two variables that explained the major themes of the research. Arrows showed the direction of influence. It is assumed/hypothesized/ that local community participation in the PCM of PSNP-NRM projects will affect sustainability of the NRM projects.

Levels of Local Community Participation		Pillars of Sustainability

| 1.Manipulative Participation |
| 2. Passive Participation |
| 3.Participation by Consultation |
| 4.Participation for Material Incentives |
| 5.Functional Participation |
| 6.Interactive Participation |
| 7.Self-Mobilization |

| 1. Environmental Aspects |
| 2. Economic Aspects |
| 3. Social Aspects |
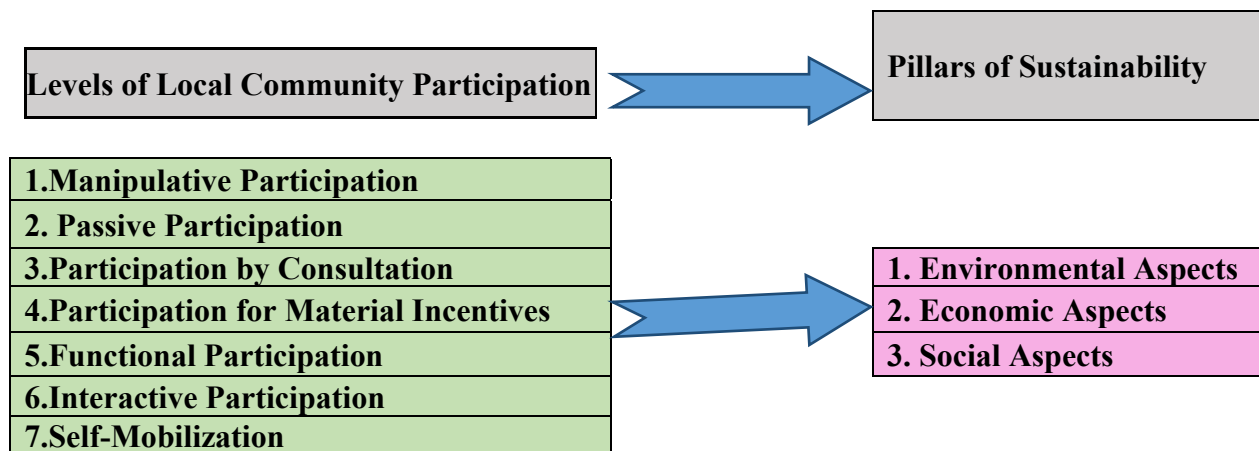
 Fig 2.4: Conceptual Framework of the Research
Source- *Pretty (1995) and Kibert et al. (2004)*

This framework was used for developing the research questionnaire. All the seven (7) levels of participation were assessed against each phase of the project to evaluate the effect of local community participation on the three (3) dimensions of sustainability of PSNP-NRM projects.

CHAPTER III: THE RESEARH METHODOLOGY

3.1. Description of the Study Area

According to Habte (2013), North Wollo administrative zone is one of the eleven (11) zones of Amhara National Regional State. It is situated in the northern part of the country and geographically located at 11°50′N 39°15′E /11.833°N 39.250°E/. It shared a border with South Wollo zone, South Gondar zone, Waghimira zone, Tigray Region and Afar Region. In addition to these neighboring areas, part of North Wollo's southern border is defined by the Mille River. The zone has nine (9) rural *woredas* namely: Meket, Wadila, Bugna, Dawnt, Gidan, Lasta, Gubalafto, Habru and Kobo.
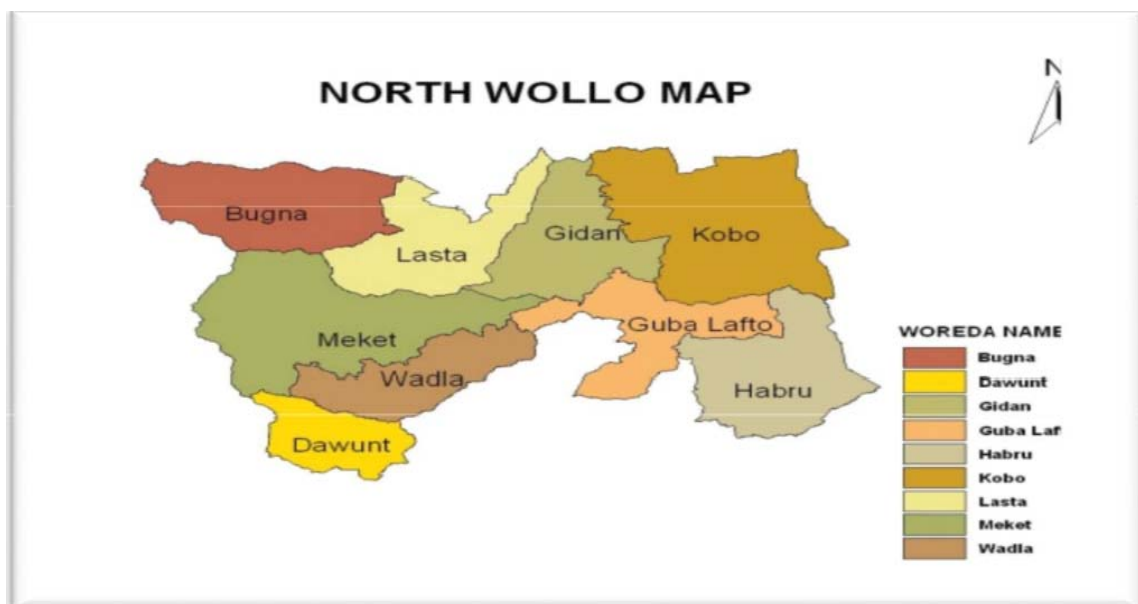
Fig 3.1: Map of Gubalafto Woreda within North Wollo Zone
Source: Habte (2013, Scale: Not revealed in the source

According to North Wollo zone FEDD (2015), Gubalafto woreda is one of the nine rural woredas of North Wollo zone. This woreda has 38 kebeles, which are both *Belg* dependent (10 kebeles) and *Meher* dependent (28 kebeles).

As described in the Wikipedia, Encyclopedia (2014), Gubalafto is bordered by the South Wollo Zone on the south, by Delanta and Wadla on the west, by Meket on the northwest, by Gidan on the north, by the Logiya River and Kobo Woreda on the northeast, and by Habru on the southeast. The woreda has a mountainous landscape ranging from 1300 to 3900 meters above sea level. Poor NRM resulted in soil erosion, which again marked by ever-expanding gullies. Increasing

population has led to shrinking farm and grazing areas. Declining soil fertility, increased incidence of crop pests and weeds, along with cultural attitudes have also made Gubalafto woreda one of the food insecure Woredas of the Amhara Region in which PSNP has been implemented since the beginning of the program.

3.2. The Research Approach

Mixed approaches i.e. qualitative and quantitative approaches were used to conduct this study. The qualitative approach laid ground for the study in getting detailed information about the practices of participation and issues of sustainability in the study area and the quantitative approach was used to collect representative data about the population and infer about the population by analyzing and interpreting the collected data.

Qualitative research typically is exploratory and/or investigative in nature. Its findings are often not conclusive and cannot be used automatically to draw conclusions. However, it is indispensable in developing a deep understanding of a given thematic complex, and sounded rationale for further decision making. Quantitative research is essential for providing a broad base of insights on which typically a final course of action can be recommended (John 2013).

In conducting this research, the researcher therefore, collected both quantitative and qualitative data through questionnaire and interview of key informants respectively.

3.3. The Research Design

To assess the effect of local community participation on the sustainability of PSNP-NRM projects causal research design was applied for this study. This helped the researcher to analyze the cause-effect relationship of levels of local community participation in the PCMs and sustainability of PSNP-NRM projects.

According to University of South California Libraries (2016), causality studies may be thought of as understanding a phenomenon in terms of conditional statements in the form, "If X, then Y." This type of research is used to measure what impact a specific change will have on existing norms and assumptions. Most social scientists seek causal explanations that reflect tests of hypotheses. Causal effect (nomothetic perspective) occurs when variation in one phenomenon, an independent variable, leads to variation in another phenomenon, the dependent variable.

3.3.1. Population and Sampling Techniques

Gubalafto *Woreda* has 38 *Kebeles*. PSNP-NRM has been practiced in all *kebeles* but in different degrees. Besides, there is government regular NRM practice through free community mobilizations. However, the two programs have been implemented in different catchments of a given *kebele*. This study specifically focused on sample kebeles where all PSNP-NRM projects have been implemented. To do this, first, stratifying the *kebeles* in to three agro ecological zones: namely *kolla* (Lowland), *Woina Dega* (Midland), and *Dega* (Highland) was made. This stratification of *kebeles* helped to get representation of the natural ecosystem and differences in rainfall patterns and agricultural practices. In most cases, *Dega* areas are usually *Belg* harvesting (*belg* rain dependent) and the other two categories are usually *Meher* harvesting (*Kiremt* rain dependent) in terms of agricultural practices. Using an inclusion criteria of existence of all types/number of PSNP-NRM projects and activities in the given kebele, 15.8% of the total 38 *Kebeles* were selected. This helped to avoid *kebeles* in which only one or few PSNP-NRM projects have been implemented due to the differences in potentials of the *Kebeles* for PSNP-NRM projects. No nursery management project, for example, if there is no reliable water source. So six *kebeles* were selected in this way with equal representation of the stratified *kebeles* by agro ecology.

The universe of the respondents of this research was the total population of Gubalafto *Woreda*. Table 2 depicted the population of Gubalafto woreda disaggregated by sex.

Table 3.1: Gubalafto Woreda Population Disaggregated by sex

Description	2007 CSA Data	2008 to 2017 population by 2.9% progression									
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total	139,825	143,880	148,052	152,346	156,764	161,310	165,988	170,802	175,755	180,852	196,289
Males	70,750	72,802	74,913	77,085	79,321	81,621	83,988	86,424	88,930	91,509	99,322
Females	69,075	71,078	73,139	75,260	77,443	79,689	82,000	84,378	86,825	89,343	96,967

Source: - North Wollo Zone FEDD (2016)

Sample selection in qualitative research is usually based on a smaller number of not-necessarily representative cases. Respondents are selected with the expectation that they fulfilled certain criteria like local knowledge, elders and social status. In quantitative research, sample selection seeks out a large number of cases that are expected to best represent the population of interest. Individual respondents are selected at random (John 2013).

The sampling unit was existing employee of the Enterprise who at least spent six months in the Enterprise. Therefore, representative sample of these employees was calculated based on formula for sample size determination and for finite population. According to Kothari (1990, p. 179) it is given by the formula

$$n = \frac{z^2.p.q.N}{e^2.(N-1) + z^2.p.q}$$

Where,

n = the desired sample size,

z = the value of the standard variation at a given confidence level (to be read from the table giving the areas under normal curve),

p = the proportion of target population estimated (50%), the most conservative sample size took the value of p = .5 and q = .5 proposed by Kothari (1990, p.179)

q = 1-p,

e = acceptable error (the precision), and

N = population size

Therefore, representative sample of population was determined at 95% degree of confidence.

Hence at 95% degree of confidence,

Z=1.96,

p=0.5,

q=1-p, =0.5

e=5% (0.05),

N=3587 and by substituting:

$$n = \frac{(1.96)^2\,(0.5)\,(0.5)\,(3587)}{(0.05)^2\,(3587\text{-}1) + (1.96)^2\,(0.5)\,(0.5)} = \frac{3444.955}{8.81 + 0.9604} = \frac{3444.955}{9.7704} = 352.591$$

this is approximately equal to 353.

According to table of sample size determination developed by Kerjcie and Morgan (1970), at 95 percent degree of confidence, the representative sample size for 3587 populations is equal to 353. This is similar with the above-calculated result. Therefore, 353 PSNP beneficiaries of different strata were participated on survey.

The population of the study was the population of the six sample *kebeles* selected on the basis of the inclusion criteria noted above. From 196,289 total populations of Gubalafto Woreda (about

39,258 HHs), total PSNP beneficiaries as of 2017 were 52,508 (10,502 HHs) which accounted 27% of the total populations of the woreda (universe of the research). From the 10,502 PSNP HHs, 34.2% (3587 HHs) belonged to the 6 sampled kebeles (population of the research). Three hundred fifty-three (353) households, which accounted about 10% of the total PSNP beneficiary HHs in the sampled kebeles were sampled as respondents of this research from whom 142 were female respondents (40%) and 211 were male respondents. In terms of HH heads, 182 of the HHs of the respondents were male headed and 171 (48.4%) were female headed HHs. The population was stratified first by two major categories: PSNP beneficiaries and non-beneficiaries. Then PSNP beneficiaries were further stratified in to labour base public works (LBPWs) and permanent direct support (PDS). LBPW beneficiaries take their entitlements by delivering required labour to the given LBPW with standard norms whereas permanent direct support (PDS) beneficiaries, do not participate in public works. LBPW beneficiaries are those ranging from 16-60 years old (60 years old not inclusive). PDS beneficiaries are those who are older than 60 years, orphans/child-headed households, permanent illness and disabilities (PSNP IV PIM, 2014). Then stratification continued by sex and age groups. Finally, random sampling technique was applied to select respondents from each stratum of PSNP beneficiaries. A stratified random sampling technique was thus applied for this study. The disaggregation was also required to understand which category/stratum of the beneficiaries have more, low or zero participation and the effect of local community participation on the sustainability of the PSNP-NRM projects. The 2017 PSNP list was used for the following disaggregation and sampling processes.

- LBPW adult male household heads or members of the household (>=16<60 years of age) who are healthy and attended LBPWs (60 not inclusive), 10% of them were sampled.
- LBPW adult female household heads or members of the households who have been able bodied and attend LBPWs for the household ((>=16<60 year-old); 10% of them were sampled
- Male Chidden who were household members of non-sampled HHs whose age ranges from 13 to 15 years old (both margins inclusive) during the project period; 10% of them were sampled. Children of non-sampled HHs was used simply to give chance to more households.
- Female Children who were household members of non-sampled HHs whose age ranges from 13 to 15 years old (both margins inclusive) during the project period; 10% of them were sampled
- Male PDS beneficiary HHs, 10% of them were sampled

- Female PDS beneficiary HHs, 10% of them were sampled

NB-16 years old has been taken as lowest bench mark age and 60 years old has been taken as highest bench mark age of the able bodied for LBPWs (PSNP VI-PIM, 2014). The researcher in consultation with implementing agencies considered 13-15 years old children as an appropriate age groups. From the experiences in doing different data collection activities from children, these groups were characterized by ease of access, better in communication and get better ideas about the PSNP-NRM projects.

Though non-PSNP beneficiary community members didn't participate in PSNP-NRM projects, they had inputs during planning & preparation processes like problem identification & prioritization, site selection and PSNP beneficiary selection/validation meetings. The researcher made key informant interview by selecting from the non-PSNP beneficiary community members to strengthen and triangulate the data collected through the quantitative survey. It was done using guiding questions/checklist. Criteria for selection of non-PSNP beneficiary households for the interview were administrative responsibility and/or experience in working with the community especially in the areas of PSNP-NRM. This helped the researcher to get ideas of the total community about NRM in general and PSNP-NRM projects in particular. The below tables summarized population and sample size of the study.

Table 3.2: Study population and sample size of the 6 Sampled Kebeles

S/N	Kebele	PW Population			PW Sample Size				PDS Population			PDS Sample Size			
		Male	Female	Total	Male	Female	Total	%	Male	Female	Total	Male	Female	Total	%
1	04KA	91	109	200	9	11	20	10.0	20	76	96	2	8	10	10
2	09KA	180	55	235	18	6	24	10.2	22	55	77	2	6	8	10
3	010KA	184	117	301	18	12	30	10.0	42	73	115	4	7	11	9.6
4	011KA	311	138	449	31	14	45	10.0	24	101	125	2	10	12	9.6
5	030KA	236	264	500	24	26	50	10	47	81	128	5	8	13	10
6	031KA	179	126	305	18	13	31	10.16	31	87	118	3	9	12	10
Total		**1181**	**809**	**1990**	**118**	**82**	**200**	**10.05**	**186**	**473**	**659**	**18**	**48**	**66**	**10**
S/N	Kebele	Children Population			Children Sample Size				Total Population			Total Sample Size			
		Male	Female	Total	Male	Female	Total	%	Male	Female	Total	Male	Female	Total	%
1	04KA	19.0	22.0	31.0	1.0	2.0	3.0	9.7	130	207	337	13	20	33	9.8
2	09KA	77.0	75.0	152.0	7.0	7.0	14.0	9.2	279	185	464	27	19	46	9.9
3	010KA	37.0	35.0	62.0	3.0	3.0	6.0	9.7	263	225	488	25	22	47	9.6
4	011KA	132.0	110.0	242.0	13.0	10.0	23.0	9.5	467	349	816	46	34	80	9.8
5	030KA	135.0	134.0	269.0	13.0	13.0	26.0	9.7	418	479	897	42	47	89	9.9
6	031KA	84.0	78.0	150.0	8.0	7.0	15.0	10.0	294	291	585	29	29	58	9.9
Total		**484**	**454**	**906**	**45**	**42**	**87**	**9.6**	**1851**	**1736**	**3587**	**182**	**171**	**353**	**9.8**

Source: Gubalafto Woreda Office of Agriculture (2017)

3.3.2. Data Sources and Data Collection Procedures

3.3.2.1.   Source of Data & Tools

The main source of data for the study was primary data. Secondary data was also collected to complement the primary data.

In collecting the primary data, the instruments of the data collection that were used include: questionnaire and semi-structured interviews while the secondary data collection tools involved document review/desk review in which various archives, reports and related literature were consulted.

Questionnaire: it was the primary tool selected for the study. The researcher prepared and used the questionnaire to collect primary data relevant to answer the research questions.

The survey questionnaire consisted of five-point Likert scale that each question has ordinal measurements ranging from "strongly disagree" represented by "1" to "strongly agree" represented by "5" on the Likert Scale measurement. There were five thematic areas of the questionnaire, these were: Part I-Basic Information of Respondents; Part II- Socio-Economic Characteristics of Households; Part III- PSNP-NRM Projects in the Research Area; Part IV- Local Community Participation in PSNP-NRM Projects in the Study Area and Part V- Sustainability of PSNP-NRM Projects in Study Area (*Hollander & Zwart, 2012 and Suman, 2015).*

Semi-Structured Interviews: The open-ended guiding questions were prepared and used to open rooms for discussion. It helped to get the qualitative data from the discussion with the interviewees/key informants/ selected from community, experts and officials of Gubalafto Woreda Agriculture Office and Save the Children. The purpose was to get in-depth information about the issue of local community participation and sustainability of PSNP-NRM projects in the study area. The information resulted from this tool was used as the base for the quantitative data collection and analysis. It also helped to strengthen and triangulate data of the study through the quantitative method.

Document Review: - The researcher reviewed relevant publications, thesis reports, other research papers, internet sources and key PSNP-NRM documents in order to enrich the study with secondary data. Among key PSNP-NRM documents annual, semi-annual and quarter result reports, survey reports, monitoring reports, post distribution monitoring/PDM/ reports, evaluation

reports, and meeting minutes/proceedings produced by implementers and evaluators were the major ones.

3.3.2.2. Procedures of Data Collection

After the selection of sample Kebeles and respondents, series of activities including recruitment of data enumerators or field assistants, delivery of short training on how, when and where to collect the data, selection of two supervisors and giving them special supervisory training were done carefully. Questionnaire was developed, tested and reviewed based on the gaps identified in the testing process. The final questionnaire was distributed with lists of sampled respondents in sampled *kebeles* to enumerators to collect the data from selected respondents. Monitoring of the data collection process and giving timely feedbacks to enumerators were indispensable processes and procedures undertaken by the researcher. Once the enumerators finalized data collection from the respondents, they assisted the researcher in obtaining the required data through semi-structured interviews with key informants. In fact, before the data collection, interview guides were prepared and given to interviewers with focus on the formulated research objectives.

3.4. Pilot Testing

Before the questionnaire was used for the purpose of collecting the actual data, it was piloted/tested as part of the enumerators' training. Once researcher's observation coupled with feedback obtained from enumerators and supervisors, corrective measures were taken on the questionnaire, comments were addressed, and the final version of the questionnaire was printed, duplicated in enough (i.e. 353 and plus) copies and given to enumerators which was used to collect the actual data. The sample size and sampled Kebeles had no change. However, some of the changes made on the questionnaire after the pilot test were:

- **Data collection about local community participation in the PCMs of PSNP-NRM**-before the pilot test, the questionnaire was prepared to collect data at PCMs level of each of the 10 PSNP-NRM projects against the 7 ladders of participation before, however, the researcher learnt from the pilot test that it was too detail to analyze using Ologit. It has been changed to participation of the local community in PCMs of PSNP-NRM projects in general against the 7 ladders of participation. As shown in appendix 2, the data collected during pilot testing has been summarized showing details of the participation levels of local community in each of the 10 PSNP-NRM projects.

- **Data collection about sustainability of PSNP-NRM Projects**- before the pilot test, the questionnaire was prepared to collect data sustainability of each of the 10 projects against the 7 key sustainability criteria across the three dimensions of sustainability i.e. environmental, economic and social sustainability, however, it was too detail to analyze using Ologit i.e. it required 10 projects*3 dimensions*7 indicators = 210 Ologit regressions and interpretations. It has been changed to sustainability of PSNP-NRM projects in general against the 7 indicators across the three dimensions. As shown in appendix 5, the data collected during pilot testing has been summarized showing details of the sustainability of each of the 10 PSNP-NRM projects across the three sustainability dimensions.

3.5. Data Analysis & Interpretation

An explanatory statistical technique, using the Stata 12 software, was applied as the primary technique of data analysis for the present study. This is used because the major objective of the research was to assess the effect of local community participation (independent/predictor variable) and sustainability (dependent/outcome variable).

Since the variables were measured on ordinal levels, ordinal logistic regression or (ordinal regression) model was used to predict the effect of the independent variable on the dependent variable. Ordinal logistic regression was used to predict the change in the ordinal dependent variable on a given scale, based on change in the independent variable. Ordinal regression enabled the researcher to determine which of the independent variables (participation or control independent variables) have a statistically significant effect on the change in the dependent variable. In an ordered regression, the odds of the dependent variable having a higher or lower value is interpreted as being associated with a unit change in the values of the independent variable.

Assumptions.

- The dependent variable is measured on an ordinal level.
- One or more of the independent variables are either continuous, categorical or ordinal.
- No Multi-collinearity - i.e. when two or more independent variables are highly correlated with each other.
- Proportional Odds - i.e. that each independent variable has an identical effect at each cumulative split of the ordinal dependent variable.

These assumptions should be tested in order as if a violation to the assumption is not correctable, one will no longer be able to use ordinal regression. If these assumptions are violated the results one gets when running ordinal regression may not be valid (Alan 2013).

To drive equation for Ologit model, the researcher used the procedure developed by Introduction to SAS (2016) combined with the work of Alan (2013) as follows.

Probabilities range between 0 and 1. Let's say that the probability of success is p, then the probability of failure is q = 1 – p. Odds are determined from probabilities and range between 0 and infinity. Odds are defined as the ratio of the probability of success and the probability of failure. The odds of success are odds(success) = p/(1-p) or p/q and odds of failure are odds(failure)= q/p. The odds ratio of success therefore will be odds ratio(success) = (p/q)/(q/p) and odds ratio of failure will be odds ratio (failure) = (q/p)/(p/q). There is a direct relationship between the coefficients produced by logit and the odds ratios produced by logistic. A logit is defined as the log base e (log) of the odds.:

i. logit(p) = log(odds) = log(p/q): -The range is negative infinity to positive infinity. In regression it is easiest to model unbounded outcomes. Logistic regression is in reality an ordinary regression using the logit as the response variable. The logit transformation allows for a linear relationship between the response variable and the coefficients:

ii. logit(p) = a + bX or [3] log(p/q) = a + bX: - This means that the coefficients in a simple logistic regression are in terms of the log odds, that is, the coefficient "c" implies that a one unit change in predictor variable results in a "c" unit change in the log of the odds/response variable/. Equation

iii. can be expressed in odds by getting rid of the log. This is done by taking e to the power for both sides of the equation.

iv. elog(p/q) = ea + bX   or [5] p/q = ea + bX: -From this, let us define the odds of being successful for two predictor variables represented by "x1" and "x2" separately:

v(a). oddsx1 = px1 /qx1

v(b). oddsx2 = px2 /qx2

The odds ratio for gender is defined as the odds of being successful for x1 over the odds of being successful for x2:

vi. OR = oddsx1 /oddsx2

For this particular example (which can be generalized for all simple logistic regression models), the coefficient b for a two category predictor can be defined as

vii(a). b = log(oddsx1) – log(oddsx2)

vii(b). b = log (oddsx1 / oddsx2)

by the quotient rule of logarithms. Using the inverse property of the log function, you can exponentiate both sides of the equality [7a] to result in [6]:

viii.   eb = e[log(oddsx1/oddsx2)] = oddsx1 /oddsx2 which means the exponentiated value of the coefficient b results in the odds ratio for predictor variables.

According to Alan (2013) and Hyun (2004), logistic regression is broadly used in many scientific fields, such as biostatistics and epidemiology. It is a simple and effective method to describe the effects of some explanatory variables on a categorical response variable. When the response variable has an ordinal nature, ordinal logistic regression is often a natural extension of standard logistic regression. A common ordinal logit model using cumulative logits considers a natural ordering of response categories. This model assumes a variable's effect on the odds of response below category i is the same for all i. The odds ratio of cumulative probabilities in the expression is called a cumulative odds ratio. The log of the cumulative odds ratio is proportional to the distance between the values of the explanatory variables, with the same proportionality constant applying to each cut-point. Because of this property, this model is called a proportional odds model. As to model and likelihood function, proportional odds model to a response variable which has the ordinal nature. Suppose that the "n" ordered categories of the response have probabilities $\pi 1$ (x), $\pi 2$ (x), $\cdots$, πn (x) when the covariates have the value x.   Let "Y" be the response which takes values in the range 1, …, "n" with the probabilities given above, and let nj (x) be the odds that $Y \leq j$ given the covariate values x, that is nj (x) = Pr $(Y \leq j|x)/\{1 - Pr(Y \leq j|x)\}$.   Then the proportional odds model is defined as nj (x) = nj exp($\eta J/x$) $(1 \leq j < n)$.

Ordinal categorical responses such as patient quality of life (excellent, good, fair, poor); political philosophy (very liberal, slightly liberal, moderate, slightly conservative, very conservative); government spending (too low, about right, too high); categorization of an inherently continuous variable, such as body mass index, BMI = weight(kg)/[height(m)]2, measured as (< 18.5, 18.5-25, 25-30, > 30) for (underweight, normal weight, overweight, obese). For ordinal response variable y with c categories, the focus is on modeling how probability (Pr), Pr (y = j), j = 1, 2, . . ., c, depends on explanatory variables x, which can be categorical and/or quantitative. The models treat observations on y at fixed x as *multinomial*. Therefore, for "y" an ordinal response (c categories)

and "x" an explanatory variable, model Pr (y _ j), j = 1, 2, · · ·, c − 1, using logits logit [Pr (y _ j)] = log [Pr (y _ j)/Pr (y > j)] = αj + βx, j = 1, . . ., c − 1. This is called a cumulative logit model.

In ordinary logistic regression, effects described by odds ratios. Here, the researcher compared odds of being below vs. above any point on the response scale (cumulative odds ratios). For fixed j, looks like ordinary logistic regression for binary response (below j, above j).

Model Satisfies $\log \left[\frac{Pr(y\_j|x1)/P(y>j|x1)}{Pr(y\_j|x2)/P(y>j|x2)}\right] = \beta(x1 - x2)$; β = cumulative log odds ratio for 1-unit increase in predictor, model assumes effect β is identical for every "cut point" for cumulative probability, j = 1, · · ·, c − 1.

Likert items are used to measure respondents' attitudes to a particular question or statement. One must recall that Likert-type data is ordinal data, i.e. it can only be said that one score is higher than another, not the distance between the points. The questionnaire for this research, therefore, has been designed in such a way that respondents to give their response in the form of Likert-Scale measurement as below;

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Ordinal logistic regression or (ordinal regression), therefore, was used to predict ordinal dependent variables (Sustainability of PSNP NMP Projects) against independent variables (levels of local community participation in PCMs of PSNP-NRM Projects). The summary output in likelihood ratio (R) gave us the estimated log-odds coefficients of each of the predictor variables shown in the coefficients columns of the output table of ologit regression. The cut-points for the adjacent levels of the response variable also shown in the intercepts section of the output table of ologit regression.

Standard interpretation of the ordered log-odds coefficient is that for a one-unit increase in the predictor, the response variable level changed by its respective regression coefficient in the ordered log-odds scale while the other variables in the model are held constant. Interpreting the estimate of the coefficient for the "dependent" variable tells us that for one-unit increase in the dependent variable the ordered log-odds of scoring in a higher category decreases/increased by a unit with the other factors in the model being held constant. The cut points are used to differentiate the adjacent levels of the response variable, i.e. (points on a continuous unobservable phenomenon, that result in the different observed values on the levels of the dependent variable used to measure the unobservable variable). R doesn't calculate the associated p-values for each coefficient by default.

The Odds ratios are simply the inverse log (i.e. the exponential) of the estimated coefficient (Alan 2013, Introduction to SAS, 2016).

For this research the below modeling steps have been considered. All variables of interest were ordinal, that is, one can rank the values, but the real distance between categories were unknown for Likert-Scale data like "Strongly Disagree", "Disagree", "Neutral", "Agree" and "Strongly Agree" responses as in this research.

i. $\Pr(Y = 1 \mid X_1, X_2, ... X_k) = F(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_K X_K + \varepsilon)$, where Pr=probability, F=function, y=dependent variable, β_0 intercept of the dependent variable and $\beta_1, \beta_2, \beta_k$ are coefficients.

ii. $\Pr(Y = 1 \mid X_1, X_2, ... X_k) = 1/(1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... \beta_K X_K + \varepsilon)})$, where ε =error term

iii. $\Pr(Y = 1 \mid X_1, X_2, ... X_k) = 1 + \left(\dfrac{1}{e^{(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... \beta_K X_K)}} \right)$

Different researchers identified that several factors could affect sustainability of NRM projects. Among others, local community participation in PCM of NRM projects(CP); rainfall (RF); population pressure (PP); free grazing (FG); land degradation(LD); deforestation (DF); soil fertility (SF); Dependency syndrome /LBPW income and deliberate destruction by the community for re-work (DS); natural hazards/disaster (ND); construction (CN); availability of alternative sources of energy (SE); use of fire wood and charcoal as sources of energy and income (SI) and land ownership policy of Federal Democratic Republic of Ethiopia (LO) were mentioned (Charles 2013). The model at iii above was then adopted to this research in the following manner.

iv. $\Pr(\text{SusPSNP-NRMP}=1 \mid \text{CP, RF, PP, FG, LD, DF, SF, DS, ND, CN, SE, SI}) = F(\text{CP+RF+ PP+FG= LD+DF+SF+ DS+ ND+ CN+SE +SI+ } \mathbf{LO+} \varepsilon)$

Because this research assumed all factors except local community participation (CP) remain unchanged, sustainability is assumed to be affected by local community participation only and the following relation was true.

v. $\Pr(\text{SusPSNP-NRMP}=1 \mid \text{CP, RF, PP, FG, LD, DF, SF, DS, ND, CN, SE, SI}) = f(\text{CP+RF+ PP+FG+LD+DF+SF+ DS+ ND+ CN+SE +SI+ } \mathbf{LO+} \varepsilon) = f(\beta_0 + \beta_1\text{CP}+ \beta_2\text{RF}+ \beta_3\text{PP}+ \beta_4\text{FG}+ \beta_5\text{LD}+ \beta_6\text{DF}+\beta_7\text{SF}+ \beta_8\text{DS}+\beta_9\text{ND}+ \beta_{10}\text{CN}+ \beta_{11}\text{SE}+ \beta_{12}\text{SI}+ \mathbf{LO+} \varepsilon)$

vi. $\Pr(susPSNPNRM = 1|CP, RF, PP, FG, LD, DF, SF, DS, ND, CN, SE, SI) = f(\beta0+\beta1CP+ \beta2RF+ \beta3PP+ \beta4FG+ \beta5LD+ \beta6DF+\beta7SF+ \beta8DS+\beta9ND+ \beta10CN+ \beta11SE+ \beta12SI+ \beta13PO + \varepsilon) = 1/(1+e^{-(\beta_0 + \beta_1 CP+\beta_2 RF + \beta_3 PP+ \beta_4 FG + \beta_5 LD+ \beta_6 DF + \beta_7 SF + \beta_8 DS + \beta_9 ND + \beta_{10} CN + \beta_{11} SE + \beta1_2 SI + \beta_{13} PO + \varepsilon')})$

$$\dfrac{1}{1 + (\dfrac{1}{e^{-(\beta_0+\beta_1CP+\beta_2RF+\beta_3PP+\beta_4FG+\beta_5LD+\beta_6DF+\beta_7SF+\beta_8DS+\beta_9ND+\beta_{10}CN+\beta_{11}SE+\beta_{12}SI+\beta_{13}PO)}})}$$

So the researcher run ordered logistic regression analysis using the corresponding equations adopted at vi above to estimate the effect of local community participation in PCMs of the PSNP-NRM projects on the sustainability of those projects and was inferred to other PSNP-NRM projects in the study area and beyond it as indicated under result and discussion section of this research report (University of South California Libraries, 2016). The sub variables/pillars of sustainability/ of the response variable were also treated independently to see which pillar of sustainability of PSNP-NRM projects have been affected by local community participation in comparison with the other two pillars and to see the existence of common areas where partial and full sustainability of NRM-Projects were exhibited.

3.6.   Ethical Considerations

A researcher involved community members and staffs of implementing organizations as sources of information and considered all ethical issues. Respecting the respondents' rights to participate or withdraw from the research being undertaken; the benefits participants of the study can obtain at the end of the research; confidentiality of data; the rights of informants to access the research report; etc. were some of the important considerations. This study was therefore, consistent with these ethical considerations and respondents who did not want to participate in the research were allowed to withdraw from the entire process. In addition, the works of others relevant to this study were properly cited while the efforts of all actors were duly acknowledged.

The research is genuine and used appropriate sources of data based on properly articulated and reviewed tools of data collection. The research report was not and will not be disclosed to any party without the approval and willingness of PSNP implementing organizations in Gubalafto Woreda and other responsible authorities.

CHAPTER IV: DATA ANALYSIS AND INTERPRETATION

4.1. Characteristics of the Respondents in Sampled PSNP HHs

The researcher mainly focused in collecting data on PSNP-NRM projects from PSNP beneficiaries for this study and FGDs with non-beneficiaries and staffs of implementing agencies. From 196,289 total populations of Gubalafto Woreda (about 39,258 HHs), total PSNP beneficiaries as of 2017 were 52,508 (10,502 HHs) which accounted 27% of the total populations of the woreda. From the 10,502 PSNP HHs, 34.2% (3587 HHs) belonged to the 6 sampled kebeles. Three hundred fifty-three (353) households, which accounted about 10% of the total PSNP beneficiary HHs in the sampled kebeles were sampled as respondents of this research from whom 142 were female respondents (40%) and 211 were male respondents. In terms of HH heads, 182 of the HHs of the respondents were male headed and 171 (48.4%) were female headed HHs. This implies that there were male respondents from female headed households (29 in number) which again depicted us still participation of women is suppressed as compared to males. This observation is in line with annual reports of Gubalafto Woreda Office of Agriculture (2010-2017). Some more details of characteristics of the respondents and beneficiary HHs have been indicated in table 3 and 4.

Table 4.1: Categories of Respondents by Age (years)

Age Categories	Number	%
Age =>13 =<15 (Children/Non-LBPW Age)	87	25%
Age =<16=<39 (Youths/LBPW Age)	79	22%
Age =>40=<59 (Adult/LBPW Age)	129	37%
Age 60 and above (Old/PDS Age)	58	16%
Total	**353**	**100**

Table 4.2: Categories of Beneficiary HHHs by Age (years)

Age of Household Head (Year)	Family Size of the HH (Number)				
	1-3	4-6	7-9	Above 10	Total
HHHs <16 years old	5	2	0	0	7
HHHs >=16 and <= 39 years old	17	45	23	0	85
HHHs >=40 and <60 years old	34	64	47	8	153
HHHs 60 years old and above	75	14	14	5	108
Total	**131**	**125**	**84**	**13**	**353**

According to Ethiopian statistics authority (2007), majority of HHHs were youths, however this study showed majority of PSNP-HHHs were Adults between 40 and 60 years old (table 4.1 and 4.2). Though participation is not limited to execution phase of PSNP-NRM, age and health

determines participation of the community in LBPWs. Community members who are healthy and between 16 to 60 years old are targeted to participate in LBPWs (PSNP-PIM, 2010 PSNP IV-PIM, 2014).

Table 4.3: Level of Education of Respondents

Sex of Respondents	Education Level of Respondents			
	Illiterate	Elementary Level I	Elementary Level II	Total
Male	77	78	56	211
Female	68	35	39	142
Total	**145**	**113**	**95**	**353**

As shown in table 4.3, majority of the respondents (59%) have attended elementary schools of whom 54% were limited to elementary level I. Males had more advantaged over females even for this very limited access to school. According to Federal '*Negaritgazet*' of The Federal Democratic Republic of Ethiopia/FDRE/, Proclamation No.391/2004, education in Ethiopia has been classified as: grade 1-4 called elementary level I; grade 5-8 called elementary level II; grade 9-10 called high school; grade 11-12 called preparatory school; and higher education is diploma and above to be attended based on successful results of students in grade 12. this research showed that educational level determines awareness about the benefit of sustainable development and ownership of the community on natural resources. Community members who can reading and writing has got formal and informal trainings on pros and cons of destructive actions on the environment and this result has been coincided with results of the researches by Mekonen (2007) and Tadesse (2014).

Table 4.4: Summary of Responses of Respondents on Major Agricultural Constraints in the Study Area

Major Occupation of HHs	Constraints of Agricultural Production in the Study area													
	Poor Soil Fertility		Shortage of Farmland		Moisture Stress		Scarcity of Grazing Land		Hazards		Affordability of Agri. Inputs		Inadequate Extension Support	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Mixed faming	156	117	251	22	273	0	228	45	221	52	178	95	130	143
Crop Production	30	20	49	1	50	0	31	19	28	22	40	10	25	25
Animal Husbandry	5	2	7	0	7	0	7	0	7	0	5	2	5	2
Off-Farm Activities	7	16	22	1	23	0	21	2	21	2	11	12	5	18
Sub-Total	**198**	**155**	**329**	**24**	**353**	**0**	**287**	**66**	**277**	**76**	**234**	**119**	**165**	**188**
G/total	**353**		**353**		**353**		**353**		**353**		**353**		**353**	

Concerning the production constraints of the area, in the same way to PSNP-IV PIM (2014) and North Wollo Zone FEDD report (2015), respondents confirmed (table12) that agriculture has been

suffered from constraints of moisture stress (100% of the respondents); shortage of farmland (93.2% of the respondents), scarcity of grazing land (81.3% of the respondents), hazards (78% of the respondents), affordability of agricultural inputs (66.3% of the respondents), poor soil fertility (56.1% of the respondents) and inadequate extension support (46.7% of the respondents). This implied that PSNP-NRM projects designed to tackle such agriculture problems of the community especially irrigation schemes to solve moisture stress; afforestation, area closure and watershed management to improve precipitation and improve soil fertility, SWC to improve soil fertility/increase productivity and water holding capacity of the soil and so on were taken as appropriate interventions but issue of ownership and sustainability has to be dealt with properly (PSNP-PIM, 2010).

4.2. Practices of Local Community participation and Issues of Sustainability in PSNP-NRM Projects in Gubalafto Woreda

This section covered the data analysis results in addressing the research questions/research objectives. Analysis implied a careful examination of the collected and recorded data within the problem statement. Due to the natures and requirements of the research objectives, data collected in relation to research objectives one and two were analyzed and interpreted using descriptive statistics as depicted in sections 4.2.1 and 4.2.2 whereas data collected in relation to research objective three were analyzed and interpreted using ordered logistic regression model as shown in section 4.2.3.

4.2.1. Extents of Local Community Participation in the PCMs of PSNP-NRM Projects in Gubalafto Woreda

As briefly described in the research framework (Pretty 1995) in the fig. 1, participation has seven (7) stairs /stages or ladders/, and in order a user to reach at the top, one should step up from the lower one. In areas or communities where there was no proper participation exercise, one could not imagine to get that communities at the top of the ladder (self-mobilization) in their level of participations at a time. The upper level of participation evolved from the lower in the ladder through time. So the researcher developed questionnaire to assess the practices of participation of the local community in PCMs of PSNP-NRM projects against the specified participation levels. The questionnaire was in the form of Likert-scale measurement ranging from strongly agree to strongly disagree.

The researcher identified 10 major PSNP-NRM projects for this study. Kebeles were stratified in to agro ecologies (*kola, Woyna Dega and Dega*) and sampled from each stratum purposively with criteria of existence of all of PSNP-NRM projects. Based on this criteria, all 10 projects existed in all six sampled Kebeles. The coverage, however, was found to be in villages of the given Kebele and questionnaire has been developed to be replied at Kebele level, not at village level to avoid confusion and data inconsistency (table 13).

Table 4.5: Availability of Productive Safety Net Program-NRM Projects in the Sampled Kebeles

Sampled Kebeles for the Research	Productive Safety Net Program-NRM Projects																		
	SWC		Gulley Treatment		Nursery Mgmt.		Forage Mgmt.		Potable Water Mgmt.		Rural Roads Catchment Mgmt.		Irrig. Scheme Dev't.		Area Closure Mgmt.		Rain Water Mgmt.		Watershed Mgmt.
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Dorogibir KA	33	0	33	0	33	0	33	0	33	0	33	0	33	0	33	0	33	0	33
Jarssa KA	46	0	46	0	46	0	46	0	46	0	46	0	46	0	46	0	46	0	46
Gedober KA	47	0	47	0	47	0	47	0	47	0	47	0	47	0	47	0	47	0	47
Woynye	80	0	80	0	80	0	80	0	80	0	80	0	80	0	80	0	80	0	80
AhunTegegn	89	0	89	0	89	0	89	0	89	0	89	0	89	0	89	0	89	0	89
Kossoamba	58	0	58	0	58	0	58	0	58	0	58	0	58	0	58	0	58	0	58
Sub total	353	0	353	0	353	0	353	0	353	0	353	0	353	0	353	0	353	0	353
Grand Total	353		353		353		353		353		353		353		353		353		353

Forage/fodder plantation was mostly in public areas and utilization has been managed in private bases, however, due to scarcity of it, most of the HHs exerted efforts to manage in private bases as well, that is why 100% of the respondents confirmed that they have fodder/forage development projects. Nursery management and forage/fodder production projects were implemented both in communal and private bases, the former with PSNP resources and the later by costs of the individuals as replication and extension of the communal activities.

As one can see in appendix 1, where long lists of projects by year and by kebele have been summarized from the research data, all project have been started before or in 2010. Physical SWC project was the pioneer of all PSNP-Projects that has been started since the inception of the program. All projects have been implemented in all Kebeles with the exception of some of them like irrigation schemes and nursery management which were not covering the whole villages in the kebele. The absence of those projects in the specified villages was confirmed that the villages have no potential for such projects especially due to the absence of reliable water sources.

Generally speaking, community participation in PSNP-NRM projects in the study area was still in the initial stages (level 1-3, i.e. manipulative, passive and consultative) in terms of the first two

phases of most PSNP-NRM projects i.e. project initiation and planning phases but progressed above the 3rd typology (participation by consultation) of participation but still below the 5th typology (functional participation) in the last three phases of project cycle i.e. execution, controlling and closing in all the 10 projects. There was little progress of community participation towards the 6th and 7th typologies (interactive participation and self-mobilization) in the last three phases of most of the projects. In some of the projects like AC, IS & PW, however, there were better community participation levels exercised in almost all phases of the projects. It has been transitioned from functional to interactive levels of community participation. However, there was no project in which self-mobilization level of participation has been practiced only little of interactive participation has been observed in AC, IS and PW projects (table 4.5 and appendix 2).

Table 4.6: Tabstat Summary Statistical Mean of <u>Levels</u> of Local Community Participation in PSNP-NRM Projects categorized by Sample Kebeles

Name of Sampled Kebele	Manipulative Participation	Passive Participation	Consultative Participation	Material Incentive Participation	Functional Participation	Interactive Participation	Self-Mobilization
Dorogibir KA	1.94	3.21	3.48	4.79	3.48	2.58	1.48
Jarssa KA	2.17	3.20	3.67	4.74	3.39	2.48	1.39
Gedober KA	2.32	2.64	3.49	4.83	3.74	2.19	1.74
Woynye KA	1.93	2.58	3.56	4.83	3.59	2.34	1.65
Ahuntegegn KA	1.92	2.73	3.67	4.80	3.57	2.39	1.64
Kossoamba KA	1.86	2.67	3.50	5.45	3.60	2.26	1.74
Total	**2.00**	**2.78**	**3.58**	**4.91**	**3.57**	**2.36**	**1.63**

In determining levels of local community participation in PSNP-NRM projects based on the statistical mean value of data gathered from the respondents, each vale is the mean of: 1=strongly disagree, 2=disagree, 3=neutral, 4 =agree and 5=strongly agree. The highest average is to mean community participation in the specified stages of participation is high.

Accordingly, most of the community members strongly agreed in "participation for material incentive-(4.91)" level of participation followed by "consultative participation-(3.58)" in the lower stair and "functional participation (3.57)" in the upper stair of the ladder of participation model that has been valued between neutral to agree. The expected/ideal participation level, as suggested by Pretty (1995) was self- mobilization (which was valued at 1.63/between disagree and strongly disagree/ and the lowest of all levels in this research) in which people participate by taking initiatives to develop and change systems independently of external institutions (table 4.6). They develop contacts with external institutions for the resources and technical advice they need, but retain control over how resources are used. Self-mobilization can spread if governments and NGOs

provide an enabling framework of support towards institutionalizing it. Such self-initiated mobilization may or may not challenge existing distributions of wealth and power (Pretty, 1995).

Table 4.7: Tabstat Summary Statistical Mean of <u>Methods</u> of Local Community Participation in PSNP-NRM Projects Categorized by Sample Kebeles

Name of Sampled Kebele	Attending Meetings	Contributing Labor	Contributing Resources	Giving Project Ideas	Attending All PCM Processes
Dorogibir KA	4.00	3.12	3.70	2.55	2.27
Jarssa KA	3.17	2.91	3.11	2.70	2.26
Gedober KA	3.83	4.34	3.53	2.09	2.57
Woynye KA	4.23	4.13	3.89	2.26	2.36
Ahuntegegn KA	4.18	4.15	3.82	2.28	2.34
Kossoamba	3.79	4.69	3.79	2.09	2.46
Total	**3.93**	**4.00**	**3.69**	**2.30**	**2.38**

Respondents confirmed that good levels of local community participation were seen and very common through the participation methods like attending planning meetings (3.93), contributed labor/executing projects (4) and contributed local materials/resource for PSNP-NRM projects (3.7) that rated at "agree" level of the Likert-Scale of measurement of the responses. Respondents responses were "neutral" to "disagree" for local community participation in suggesting project ideas and participating in PCMs i.e., rated at 2.38 and 2.3 respectively that implied the communities were not participated through the specified methods of participation. None respondents confirmed full participation/strongly agreed/ in any of the methods of participation.

Table 4.8: Summary Statistical Mean of <u>Purpose</u> of Local Community Participation in PSNP-NRM Projects Categorized by Sample Kebeles

Name of Sampled Kebele	Forced by Externals	Societal Influence /Bylaw/	To Get Payments in Exchange of Labor	To Fill Food gaps by PSNP Ration for Labor	Long/Short Term Benefits from PSNP-NRM Projects	Ownership by the Community	Empowerment of the Community
Dorogibir KA	2.55	3.45	4.88	4.73	3.61	3.21	2.48
Jarssa KA	2.72	2.85	4.80	4.72	3.57	3.13	2.39
Gedober KA	2.51	3.02	4.72	4.62	3.83	2.85	2.11
Woynye KA	3.15	2.75	4.79	4.56	3.75	2.94	2.19
Ahuntegegn KA	2.85	2.61	4.75	4.73	3.80	2.91	2.19
Kossoamba KA	1.98	2.62	4.93	4.91	3.78	2.79	2.00
Total	**2.69**	**2.81**	**4.80**	**4.71**	**3.74**	**2.95**	**2.20**

According to Samuel (1987), there could be seven major causes of community participation in NRM/development projects, namely: forced, societal influence, payment/incentive, job opportunity/cover consumption gaps, potential benefits of outcomes of projects, ownership of

projects and the environment, and concern for future generation. The latter three were considered as true purposes of community participation while the former four were considered as forced purpose of participation. According to this research, "agree" to "strongly agree" responses of respondents were attained for "participation for payment" and "participate to cover consumption gaps", which are under forced participation forced by the chronic food insecurity as confirmed in the PSNP IV-PIM (2014). True participation, according to the respondents, has been at its earlier stage ("neutral" to "agree" /3.74/) in participating i.e. "participation for future benefits of PSNP-NRM projects". All the rest purposes of participation were not or little practiced in the area which rated from "disagree" to "neutral" in the Likert-Scale measurement (table 4.8).

Table 4.9: Summary Statistical Mean of <u>Effect of Awareness, Knowledge, Experience and Payments</u> on Local Community Participation in PSNP-NRM Projects in the Sample Kebeles

Name of Sampled Kebele	Awareness Trainings Enhanced Participation	Literacy/Level of Education/Enhanced participation	Experience in PSNP-NRM LBPW Enhanced Participation	Payments in Grain or Cash for Labor Enhanced Participation
Dorogibir KA	4.67	3.03	3.94	4.64
Jarssa KA	4.41	3.15	4.17	4.39
Gedober KA	4.36	3.11	4.30	4.77
Woynye KA	4.19	3.14	4.14	4.70
Ahuntegegn KA	4.26	3.09	3.84	4.88
Kossoamba KA	4.48	3.07	4.24	4.72
Total	**4.35**	**3.10**	**4.09**	**4.71**

Awareness, knowledge and experience were assessed towards their effect on community participation in the PCMs of PSNP-NRM projects and all responses ranged from agree to strongly agree on the importance of awareness raising activities by externals coupled with the experiences of the community members in PSNP-NRM projects activities those had significant effects on communities' participation. Responses on these factors ranged from "agree" to "strongly agree" i.e. mean values ranged from 4.1 to 4.4 in the Likert-Scale. However, on the Knowledge/level of education/ of community members, respondents confirmed that literacy and illiteracy had no vivid difference in affecting community participation in PSNP-NRM projects (rated at neutral in the Likert-Scale) (table 4.9).

Table 4.10: Summary Statistical Mean of <u>Effect of Wealth Ranks and Distribution of Benefits of NRM Projects</u> on Local Community Participation in PSNP-NRM Projects Categorized by Sample Kebeles

Name of Sampled Kebele	Poor Participated Better than Other Community Groups	Middle Participated Better than Other Community Groups	Better-Off Participated Better than Other Community Groups	Poor Benefited from PSNP-NRMs more than Other Community Groups	Middle Benefited from PSNP-NRMs more than Other Community Groups	Better-Off Benefited from PSNP-NRMs more than Other Community Groups	Landless Youths Benefited from PSNP-NRMs more than Other Community Groups	Females Benefited from PSNP-NRMs more than Other Community Groups	All Benefited from PSNP-NRMs Equally
Dorogibir KA	4.48	2.91	1.76	4.21	2.48	1.24	4.15	3.15	2.82
Jarssa KA	4.72	3.00	1.65	4.17	2.39	1.24	4.02	2.50	3.07
Gedober KA	4.85	2.96	1.68	4.11	2.11	1.19	4.38	2.70	3.26
Woynye KA	4.56	3.40	1.71	4.11	2.21	1.26	4.39	2.79	3.08
Ahuntegegn KA	4.56	3.10	1.74	4.12	2.20	1.22	4.38	3.06	2.63
Kossoamba KA	4.79	3.21	1.66	4.00	2.00	1.16	4.57	3.05	2.07
Total	**4.65**	**3.14**	**1.70**	**4.11**	**2.21**	**1.22**	**4.35**	**2.88**	**2.80**

Respondents confirmed that participation in PSNP-NRM projects have been significantly affected by wealth ranks of the community as indicated in PSNP IV-PIM (2014). Poor and landless youths participated more than other groups of HHs and were benefited from PSNP-NRM projects better than other groups. Middle groups also participated in PSNP-NRM projects better than better off groups (3.1= "neutral to agree"). However, respondents confirmed (responses ranged from "neutral" to "agree" in the Likert-Scale measurement) that distribution of benefits didn't have effect on participation of local community in PSNP-NRM projects, what matters was wealth ranks (table 4.10).

Table 4.11: Summary of Statistical Mean of <u>Effect of Special Attention to Community Groups</u> on Local Community Participation in PSNP-NRM Projects Categorized by Sample Kebeles

Name of Sampled Kebele	More Attention is Given to Women	More Attention is Given to Landless Youths	More Attention is Given to Middle Age	More Attention is Given to Old Age	More Attention is Given to Children	More Attention is Given to Ill and Disabled	More Attention is Given to Poor
Dorogibir KA	2.48	4.30	2.52	3.64	1.00	3.64	4.61
Jarssa KA	2.39	4.17	2.59	3.65	1.00	3.65	4.50
Gedober KA	2.11	4.51	2.49	3.64	1.64	3.61	4.68
Woynye KA	2.20	4.49	2.70	3.65	1.61	3.65	4.53
Ahuntegegn KA	2.21	4.46	3.00	3.65	1.61	3.66	4.53
Kossoamba KA	2.00	4.60	3.09	3.67	1.93	3.65	4.72
Total	**2.21**	**4.44**	**2.78**	**3.65**	**1.53**	**3.65**	**4.58**

In respect to attention to community groups to participate in PSNP, externals gave enough attention to landless youths and chronically food insecure poor people as stated in PSNP IV-PIM (2014). The response of respondents confirmed by key informants for these groups ranged from agreed to strongly agree to wards the attention given to those groups and so participated in PSNP-NRM projects. Average attention has been also given for ill/disabled and old age groups to include in the PDS but their participation in PSNP -NRM projects was minimal to none (table 4.11).

Table 4.12: Summary Statistical Mean of <u>Effect of Age, Sex and Health Condition</u> in the Community on Local Community Participation in PSNP-NRM Projects Categorized by Sample Kebeles

Name of Sampled Kebele	Children	Youth	Adult	Old	Male	Female	Healthy	Ill/Disabled
Dorogibir KA	2.30	3.33	3.48	2.48	4.24	2.48	4.52	1.39
Jarssa KA	2.24	3.87	3.76	2.48	4.00	2.39	4.52	1.28
Gedober KA	1.77	3.62	4.06	2.38	4.53	2.62	4.66	1.57
Woynye KA	1.78	3.40	4.04	1.98	4.51	2.53	4.58	1.60
Ahuntegegn KA	1.73	3.40	3.89	1.91	4.51	2.51	4.57	1.60
Kossoamba KA	1.38	3.33	4.43	1.88	4.71	2.52	4.72	1.66
Total	**1.81**	**3.47**	**3.98**	**2.11**	**4.45**	**2.51**	**4.60**	**1.54**

This research confirmed that all categories had effect on community participation i.e., from age groups adults participated than others; from sex groups males participated than females and healthy community groups participated more than ill and disabled groups in the PSNP-NRM projects (table 4.12)

Participation level of local community on all PSNP-NRM projects has been illustrated in appendix 3. Local community participation in PCMs (problem identification denoted by "i", project planning denoted by "p", execution denoted by "ex", monitoring denoted by "m", evaluation denoted by "ev" and closing denoted by "c") of each identified projects in PSNP-NRM (soil water conservation denoted by "SWC", gulley treatment denoted by "GT", nursery management denoted by "NM", forage/fodder management denoted by "FM", watershed management denoted by "WM", area closure denoted by "AC", rain water harvesting denoted by "WH", potable water development denoted by "PW", irrigation scheme development denoted by "IS" and rural roads catchment management denoted by "RC" were summarized by tabstat in the respective order to get the summary mean of responses against each phase/cycle of each project. Concerning participation in those project phases of different projects, respondents confirmed (response ranges

from agree to strongly agree) that people participated in the execution phase in all 10 identified PSNP-NRM projects. Good attempt was also observed in the closing phase of some of projects like potable water development, irrigation scheme development and rural roads catchment management (responses range from neutral to agree). Better participation levels in all project phases (response ranged from agree to strongly agree in the Likert-Scale) in PCMs of potable water development, irrigation scheme development, gulley treatment and rural roads catchment management projects. However, local community participation in problem identification, planning, monitoring and evaluation phases were limited to strongly disagree to neutral levels of responses in rest of PSNP-NRM projects. Extremely poor level of participation (response ranged from strongly disagree to neutral in the Likert-Scale) in almost all phases was depicted in the rain water harvesting projects.

Table 4.13: Summary of Statistical Mean of <u>Effect of External Forces</u> in the Community on Local Community Participation in PSNP-NRM Projects categorized by Sample Kebeles

Name of Sampled Kebele	Land Ownership Policy Enhance Participation	Local Government forced community to participate in NRM	Punishment for Absenteeism forced community to participate	Top-Down Approach forced community to participate	Availability of Credit for PSNP Beneficiaries Initiate Participation
Dorogibir KA	2.00	3.36	3.70	1.73	4.00
Jarssa KA	2.04	3.70	3.76	1.76	3.98
Gedober KA	2.23	3.96	4.04	1.96	4.51
Woynye KA	2.15	3.81	3.93	2.05	4.46
Ahuntegegn KA	2.15	3.72	3.93	2.01	4.46
Kossoamba KA	2.19	4.14	4.05	2.21	4.71
Total	**2.14**	**3.80**	**3.92**	**1.99**	**4.40**

From the external forces that were exerted to initiate or influence community participation on PSNP-NRM projects, facilitation of credit had a significant influence on the community participation. This result was in line with PSNP IV-PIM (2014) objectives that PSNP beneficiaries were expected to be supported by business plan to track asset buildings for graduation and facilitate credits before, during and after graduations. Local GoE actions/measures by taking attendances and temporarily deduction of ration for absentees (application of absenteeism management system in PSNP IV-PIM (2014)) were also forced PSNP beneficiaries to participate in LBPWs (table 4.13)

Table 4.14: Summary Statistical Mean of Local Community Participation in <u>Project Cycle</u>
<u>Management /PCM/</u> of PSNP-NRM Projects Categorized by Sample Kebeles

Name of Sampled Kebele	Initiation Phase	Planning Phase	Execution Phase	M&E and Controlling Phase	Closing Phase
Dorogibir KA	2.21	2.48	4.03	2.55	3.00
Jarssa KA	2.11	2.33	4.39	2.30	3.04
Gedober KA	1.85	2.81	4.28	2.81	2.96
Woynye KA	2.30	2.18	4.41	2.65	3.55
Ahuntegegn KA	2.53	2.55	4.44	2.62	3.61
Kossoamba KA	2.19	2.36	4.33	3.28	3.43
Total	**2.25**	**2.43**	**4.35**	**2.71**	**3.35**

In line with PSNP-PIM (2010), local community participated in execution phase of the cycle. participation in project identification, planning, monitoring/evaluation was not existing. Little participation was seen in closing phases in specific projects like potable water and irrigation schemes (table 4.14 and appendix 2).

4.2.2. The Practices of Issues of Sustainability of PSNP-NRM Projects in Gubalafto Woreda

According Azad University (2010), there are several factors that affect sustainability of natural resources. Among them are degradation, population pressure, community participation, ownership and empowerment, natural hazards, free grazing, deforestation, construction, availability of sources of energy were mentioned. One factor, however could not stand alone, effects could be intermingled. In this research, though the major focus on the effect of local community participation on the sustainability of NRM projects, the researcher tried to find out the perceptions of the community on those factors by drawing five-point Likert-Scale measurements. Table 4.14 summarized the responses of the respondents in this regard.

Table 4.15: Summary Statistical Mean of _Factors Affecting Sustainability_ of PSNP-NRM Projects Categorized by Sample Kebeles

Name of Sampled Kebele	Participation Enhanced Sustainability	Availability of Enough Rain/Moisture Enhanced Sustainability	Population Pressure didn't affect Sustainability	Extent of Free Grazing didn't affect Sustainability	Extent of Deforestation didn't affect Sustainability	Extent of Land Degradation didn't affect Sustainability	Good Soil Fertility Enhanced Sustainability	No Dependency Syndrome that affected Sustainability	Extent of Disasters didn't affect Sustainability	Extent of Charcoal and Fire wood sales didn't affect Sustainability	Extent of Construction Activities didn't affect Sustainability	Alternative Energy Sources Enhanced Sustainability	GoE Landholding Policy Enhanced Sustainability
Dorogibir KA	2.52	2.94	2.42	3.82	2.48	2.27	2.52	3.27	2.76	2.42	2.36	2.21	2.39
Jarssa KA	2.24	2.52	2.57	4.00	2.35	2.46	2.35	3.26	3.37	2.22	2.26	2.30	2.35
Gedober KA	2.74	2.64	2.38	3.60	2.66	2.32	2.28	3.17	2.89	2.23	2.02	2.19	2.47
Woynye KA	2.48	2.34	2.61	3.30	2.29	2.44	2.23	2.89	2.99	2.53	2.39	2.30	2.49
Ahuntegegn KA	2.61	2.55	2.53	3.37	2.34	2.64	2.20	3.01	2.98	2.87	2.56	2.69	2.31
Kossoamba KA	2.43	2.24	2.36	3.41	2.00	2.62	2.50	3.00	2.76	2.60	2.36	2.64	2.28
Total	**2.51**	**2.50**	**2.50**	**3.52**	**2.33**	**2.49**	**2.31**	**3.06**	**2.96**	**2.54**	**2.36**	**2.43**	**2.38**

The researcher collected data on this question to open room to discuss with respondents on factors affecting sustainability but local community participation was taken as the main focus of this study and the effect of local community participation on sustainability of NRM projects has been investigated. The questionnaire was prepared in the form of positive statement so as to make the direction of change of all factors similar. Those factors, according to Charles (2013) were local community participation, moisture stress, population pressure, free grazing, land degradation, deforestation, poor soil fertility, natural and man mad disaster, firewood and charcoal sales, construction, unavailability of alternative energy/fuel sources like kerosene and land holding policy of the local government. Through the degree was different across kebeles and respondents as well as factors, almost all of the respondents agreed that all factors affected sustainability of NRM projects in their respective kebeles. The most important ones were local community participation, free grazing, issue of soil fertility, degradation and construction (table 4.15). The list graded factor that affected sustainability was dependency syndrome and destruction of works to re-work and get payments (ranges from "disagree" to "neural" in Likert-Scales as shown in the response summary table 4.15). This result was also in agreement with qualitative information from FGDs that farmers were destructing SWC structures to re-work next year and gat ration in the first two to three years of the start of PSNP (2005-2007), but in later times, due to frequent awareness raising about the positive impact of the structures on the production and productivity of crops, vegetables, cash crops and animals, there is significant improvement in protecting the works done.

4.2.2.1. Environmental Sustainability

Besides, the descriptions in this research framework in chapter II, according to Donald (1961), environmental sustainability is the ability of the environmental system of the given area to meet the needs of the present users without affecting the needs of future generation. The maintenance of the factors and practices that contribute to the quality of environment on a long-term basis. According to Maureen (2010) sustainability indicators are very complex and versatile. An indicator is something that helps one to understand where it is, which way it is going and how far it is from where it wants to be. A good indicator alerts one to a problem before it gets too bad and helps to recognize what needs to be done to fix the problem. Indicators of a sustainable community point to areas where the links between the economy, environment and society are weak. They allow one to see where the problem areas are and helps to show the way to fix those problems. Indicators of sustainability are different from traditional indicators of economic, social, and environmental progress. Traditional indicators such as stockholder profits, asthma rates, and water quality respectively measure changes in one part of a community as if they were entirely independent of the other parts. Sustainability indicators reflect the reality that the three different segments are very tightly interconnected, as shown in the figure below:
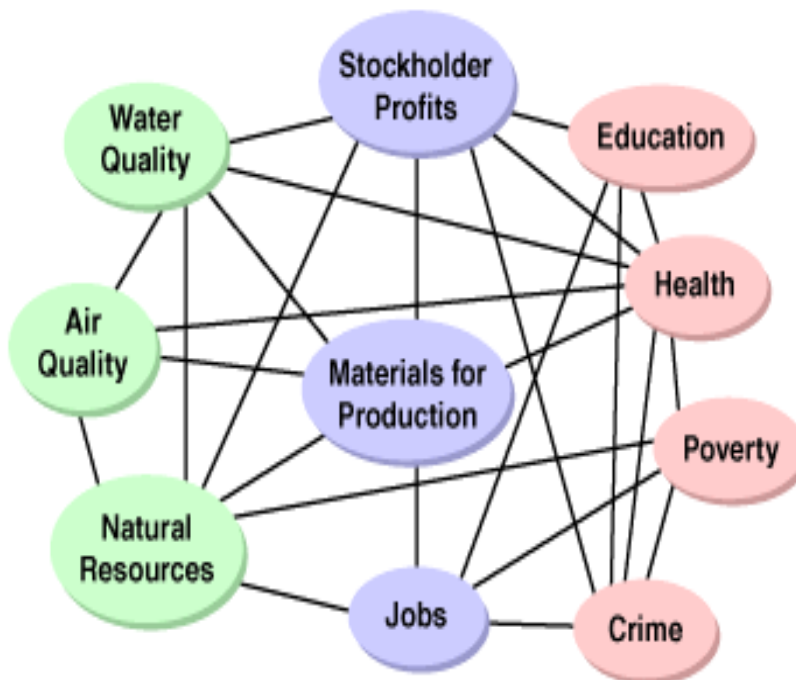
Fig 4.1: Network of Indicators of Sustainability
Source Maureen (2010)

As this figure illustrates, the natural resource base provides the materials for production on which jobs and stockholder profits depend. Jobs affect the poverty rate and the poverty rate is related to crime. Air quality, water quality and materials used for production have an effect on health. They may also have an effect on stockholder profits: if a process requires clean water as an input, cleaning up poor quality water prior to processing is an extra expense, which reduces profits. Likewise, health problems, whether due to general air quality problems or exposure to toxic materials, have an effect on worker productivity and contribute to the rising costs of health insurance. Sustainability requires this type of integrated view of the world.

The concept then adopted to this research and environmental sustainability could be assessed using indicators such as wise-use and protection from destruction of non-renewable natural resources from any form of destruction. So the researcher developed questionnaire to assess the wise-use of PSNP-NRM Project outcomes and protection from destructions of those projects, collected the data, analyzed and interpreted.

Table 4.16: Summary Statistical Mean of Environmental Sustainability in terms of Physical Availability of PSNP-NRM Projects Categorized by Sample Kebeles

Name of Sampled Kebele	Status of SWC	Status of GT	Status of NM	Status of FM	Status of PW	Status of IS	Status of RC	Status of AC	Status of WH	Status of WM
Dorogibir KA	2.97	3.82	2.55	3.00	4.64	3.79	4.09	4.06	1.48	3.45
Jarssa KA	3.15	3.50	2.91	2.85	4.74	3.59	4.35	4.17	1.39	3.46
Gedober KA	3.00	4.00	3.21	2.89	4.43	3.66	4.30	4.45	1.40	3.36
Woynye KA	3.26	3.76	3.14	2.53	4.31	3.68	4.43	4.63	1.44	3.58
Ahuntegegn KA	2.90	3.66	2.80	3.56	4.37	3.70	4.25	4.55	1.44	3.42
Kossoamba KA	3.16	3.69	2.26	3.22	4.38	3.74	3.76	4.79	1.28	2.86
Total	**3.08**	**3.73**	**2.83**	**3.04**	**4.44**	**3.69**	**4.21**	**4.50**	**1.41**	**3.36**

The researcher developed a questionnaire and collected general views of the community through the respondents of this research about the current physical status/physical availability of PSNP-NRM projects in their kebeles/villages. Likert-Scale data has been collected using ratings like 1=rarely exist, 2=exist with repeated rehabilitation initiated by externals, 3=exist with repeated rehabilitation initiated by the community and externals, 4=exist with some rehabilitation initiated by the community & externals, and 5=exist without any rehabilitation (table 4.16). The ratings are in an increasing order in the Likert-Scale measurement towards sustainability of respective projects in terms of at least physical availability of the project elements in long-term.

Summary statistical mean of responses showed that physical projects like potable water development (PW), and irrigation scheme construction (IS) performed better (rated at 4.44 and 4.21 respectively which means those projects existed with some rehabilitation works initiated by the community and externals) than most biological projects like nursery management (NM), watershed management (WM), and forage plantation and management (FM), which rated from 2.83 to 3.36 on average in the Likert-Scale i.e. existed with repeated rehabilitation initiated by the community and externals in terms of physical availability towards environmental sustainability.

Fig. 4.2: Woynye Potable Water Development Project (top) and Jarssa Small Scale Irrigation Project (bottom) of PSNP in Gubalafto Woreda

Exceptions from biological PSNP-NRM projects against this indicator were area closure management (AC) which was in better condition towards existence and performance (rated at 4.50 which indicated that AC projects existed almost without any rehabilitation works and rural roads catchment management (RC) plus gully treatment (GT) which rated 3.68 and 3.73 respectively which indicated that these projects existed with some rehabilitation works initiated by the community and externals. Rain water harvesting and management (WH), however, was the one which failed significantly (rated at 1.41 which mean rarely exist) in terms of current status/existence of PSNP-NRM projects. Current existence of PSNP-NRM projects, however, did not guaranty sustainability, existence could be as the results of forced protection by externals, exist but might be malfunctioning, exist but might not be developed to give outcomes and so on whereas sustainability, according to Pretty (1995) & Tadesse (2014) is guaranteed by community ownership and wise use of NRM projects in continuous bases. No project was fully rated at 5 in the Likert-Scale i.e. no project was existed without any rehabilitation works (table 24). This research result is in contradiction to the data/report of local GoE (2010-2016) illustrated in appandix-4.

Up on desk review of those reports, from the area of 17,900 hectares surveyed for forest development in Gubalafto Woreda, 17,350 hectares of land has been covered by forest. For this practice, 237,840,000,000 tree seedlings were raised from 2010 to 2016 fiscal years; 224,438,000,000 were planned in those areas and 189,696,700,000 seedlings were survived according to annual survival count reports of the local government (2010-2016), it implied that there are 166 seedlings survived in one-meter square area of the woreda (unjustifiable). 58,000 households were participated in the catchment/watershed management practices in the specified years. Besides, 1,522,064.42 hectare of land has been reported as treated by different biological SWC activities, 33,919 kilometers of different physical SWC activates, 1,576,472 m^3 of check dam, 18,922,598,405,000 different types of trenches, micro basins, and water percolation pits were performed in the specified seven years.

Fig. 4.3: Dorogibir Area Closure Project (top left), Jarsa Gulley Treatment (top right) Jarsa Rural Roads Catchment Management Project (bottom left), Gedober Water Harvesting Project (bottom right) of PSNP in Gubalafto Woreda

The existence of these physical and biological project activities have been estimated to cover more than the total area of Gubalafto Woreda is 140,079 hectares (Gubalafto Woreda Office of Agriculture, 2017) i.e. 16,587 structures per m^2 is unjustifiable. Yet, most were not physically found in the reported quantity as well as quality and so didn't serve the intended purposes (appendix 5) (Gubalafto Woreda Office of Agriculture Annual Report, 2010-2016).

Table 4.17: Summary of Statistical Mean of Environmental Sustainability in terms of <u>Wise Use</u> <u>and Protection from destruction</u> of PSNP-NRM Projects Categorized by Sample Kebeles

Name of Sampled Kebele	Wise-Use	Protection from any Form of Destruction
Dorogibir KA	2.48	2.52
Jarssa KA	2.93	2.67
Gedober KA	2.96	2.43
Woynye KA	2.81	2.45
Ahuntegegn KA	2.62	2.26
Kossoamba KA	2.59	2.28
Total	**2.73**	**2.41**

The responses on the responsibility of the community on the success or failure of sustainability of PSNP-NRM projects in terms of wise use and protection from destruction was rated at "neural", which indicated, the community still lacked ownership of the projects (table 4.17). This research result matched with sturdy result of Mekonen (2007) and Semane (2013), according to those researchers, there were little efforts to enhance community empowerment in which conservation activities and their sustainability were unsatisfactory. However, it stood against the research result of Chimdessa (2016), the result of the research was that current practices were more useful (more participatory) on watershed sustainability than the previous ones characterized by lack of community participation, ignoring indigenous knowledge, land tenure insecurity, disincentives and unmanageable planning units, as a result the current watershed practices have been sustained.

Besides, the community representatives in the pilot test and in the FGD responded that potable water development, area closure and irrigation scheme development were relatively better sustained environmentally against the criteria of wise of products and byproducts of these projects by the community. Forage development, watershed management, gulley treatment and rural roads catchment management were partially sustained towards environmental sustainability against the criteria. However, nursery management and rain water harvesting did not sustain when measured against the wise use of them by the community. The community representatives further showed that protection of area closure, potable water, and rural roads catchment management had given relatively good protection activities from any form of destruction of these projects. The responses for the protection of the rest of the PSNP-NRM projects, especially rain water harvesting lacked protection from the destruction (appendix 5).

4.2.2.2. Economic Sustainability

The concept in figure-7 at page 58 was also made for the base to develop questionnaire to assess economic sustainability of PSNP-NRM projects. The researcher asked respondents to confirm or deny the economic benefits they gained from the implementation of PSNP-NRM projects in a

long-lasting manner. Questionnaire focused on the increase production and productivity of crops, livestock and other sources of incomes as a result of PSNP-NRM projects as well as the direct economic benefits like sales of products/by-products and services of the projects in sustainable bases. Results of the practices of issues of sustainability have been summarized as follows. The questionnaire was developed to get Likert-Scale data in the same way as environmental sustainability assessment questions.

Table 4.18: Summary of Statistical Mean of Economic Sustainability in terms of <u>Increase Productivity and Production and Sales of Products/Byproducts</u> as a Result of PSNP-NRM Projects Categorized by Sample Kebeles

This research confirmed that PSNP-NRM projects contributed for the increase of productivity and production of agriculture in the study area (rated at 4 = "agree" in the Likert-Scale). From the FGD, it was confirmed that SWC, Irrigation scheme development, area closure management, potable water development, and rural roads catchment management, contributed to the increase of

Name of Sampled Kebele	Increase Productivity and Production	sale of Products and Byproducts
Dorogibir KA	3.85	3.82
Jarssa KA	3.76	3.96
Gedober KA	4.43	3.85
Woynye KA	4.48	3.60
Ahuntegegn KA	4.42	3.29
Kossoamba KA	4.16	3.83
Total	**4.25**	**3.66**

productivity and production of agriculture in the study area. The rest of the projects performed partially in terms of increasing production and productivity in a sustainable way, however, rain water harvesting project and nursery management projects were found the least in terms of contributing to the productivity of crops and animals. This research result disagreed with the reports of local GoE (appendix 3), from 2010 to 2016 fiscal year, it said 58,000 households generated incomes of 53,622,801.40 Birr from seedling raising and selling plus tree plantation and selling. When this amount was diverted in to households, it was 7,660,400.20 Birr per annum and it was 132 Birr/annum/household and is found to be insignificant to cover household consumption gaps.

Respondents confirmed that the PSNP-NRM projects contributed to the economy of the household through the direct sale of products, byproducts or services (score about 4 in the Likert-Scale), i.e. respondents "agree" to "strongly agree" about those projects contributions specific to this indicator. Respondents confirmed that these projects helped the community in increasing income for household consumptions through direct use of products and byproducts as well as sales and exchanges (table 4.18).

Fig. 4.4: Woinye Physical and Biological Soil and Water Conservation project (bottom left), Jarssa Small Scale Irrigation/Gulley Crossing/ Project (top right) and Woynye Nursery Management Project (bottom)

This result was further triangulated with qualitative information from FGDs of community members and key informants of PSNP-NRM implementing organizations. Accordingly, though NRM was the problem of the community, for example in fodder and fodder development projects, either the varieties were not liked by animals or the quantity of harvest has been minimal to none as compared to the needs. This has been aggravated by the large number of herds with poor quality of products and byproducts like milk, meat, labor and market prices which resulted in low response to investment on forage/fodder projects.

Based on the pilot data and FGD results, SWC, irrigation schemes, area closure, potable water, and rural roads catchment management, contributed to the economy of the household through the direct sale of products, byproducts or services. Interviewees confirmed that these projects helped the community in increasing income for household consumptions through direct use of products and byproducts as well as sales and exchanges. The rest three have been categorized to no contribution to the economy of the households (especially rain water harvesting has lower rank in the Likert scale) (appendix 5).

4.2.2.3. Social Sustainability

Social sustainability has basically been also assessed based on the indicators shown in fig.7 by Maureen (2010). The adapted basic questions that respondents asked were job security/job

opportunity due to PSNP-NRM projects, establishment and running of sustainable CBOs, strengthening of social networks and bylaws, compatibility of NRM policies and procedures with community needs, decision making power of the community, equal distribution of benefits, and sustainable conflicts management in the communities of up-team and down-stream of PSNP-NRM project areas were among others and results of the study on this aspect have been summarized in table 4.19.

Table 4.19: Summary of Statistical Mean of Social Sustainability of PSNP-NRM Projects Against Job Opportunity, Establishment and Running of CBOs and Social Services Categorized by Sample Kebeles

Name of Sampled Kebele	Sustainable Job Opportunity /Security	Sustainable CBOs	Sustainable Social Services
Dorogibir KA	3.94	4.30	3.55
Jarssa KA	4.11	4.43	3.50
Gedober KA	4.00	3.89	3.23
Woynye KA	3.98	3.76	2.98
Ahuntegegn KA	4.22	4.25	3.01
Kossoamba KA	4.33	4.33	2.97
Total	**4.11**	**4.13**	**3.14**

The best social sustainability outcome of all PSNP-NRM projects (including rain water harvesting) according to this research was Social Sustainability through "job opportunity and job security" and "establishment and running of community based organizations /CBOs/" like watershed committee, kebele and community food security task forces, potable water committee, watershed committee, development committee, irrigation committee, SWC foremen/forewomen, and nursery management foremen and rated at "agree" in the Likert-Scale.

For the rest of the social sustainability indicators, respondents responded and rated between "disagree" to "neutral" in the Likert-Scale i.e. the rest of the indicators were not met by implementing PSNP-NRM projects (table 4.19).

Fig. 4.5: Kosoamba Forage/Fodder Mgmt. Project (leftt), Dorogibir Watershed Mgmt. Project (right) and of PSNP in Gubalafto Woreda

This research result mismatched with the research result of Simane (2013) with the finding that only 28.6% of the CBOs working in NRM were sustained by social, environmental, institutional,

financial and technical diminutions of sustainability (71.4% of CBOs were not sustained) and so the NRM projects.

4.2.3. The Effect of the Local Community Participation on the Sustainability of PSNP-NRM Projects in Gubalafto Woreda

The status and the practices of all the 10 PSNP-NRM projects have been analyzed and interpreted using tabstat through summary statistical means of responses in reaction to research Objective-I and Objective-II. This section/research Objective-III/, unlike other two sections/objectives/ dealt at section 2.2.1 and 2.2.2 using descriptive statistics, the researcher analyzed data collected using ordered logistic regression statistical model, and interpreted the effect of the local community participation in PCMs of PSNP-NRM Projects on the sustainability. The general equation of the model was adapted from Alan (2013) as detailed in the research design, data analysis and interpretation (section 3.3 and section 3.6).

$$\Pr(Y=1|X_1, X_2,...X_k) = \frac{1}{1 + (e^{(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... \beta_K X_K)})}$$ which was adapted to this research

context as follows:

$$\Pr(susPSNPNRM = 1|CP, RF, PP, FG, LD, DF, SF, DS, ND, CN, SE, SI) = f(\beta_0 + \beta_1 CP + \beta_2 RF + \beta_3 PP + \beta_4 FG + \beta_5 LD + \beta_6 DF + \beta_7 SF + \beta_8 DS + \beta_9 ND + \beta_{10} CN + \beta_{11} SE + \beta_{12} SI + \varepsilon) =$$

$$\frac{1}{1 + (e^{-(\beta_0 + \beta_1 CP + \beta_2 RF + \beta_3 PP + \beta_4 FG + \beta_5 LD + \beta_6 DF + \beta_7 SF + \beta_8 DS + \beta_9 ND + \beta_{10} CN + \beta_{11} SE + \beta_{12} SI)})}$$

The change in the sustainability of PSNP-NRM Projects- the dependent variable (the "Y") was determined by the changes in the independent variable-local community participation-the (the "X") given that other independent variables were controlled. Objective-III, therefore, was designed to be analyzed effect of Objective-I (practices of participation) on success of Objective-II (Practices of sustainability) in the PSNP-NRM projects of the specified communities given other factors affecting sustainability held unchanged. In this case, average of participation of local community in the five project phases of all the 10 projects was taken as one variable (local community participation) and regressed with the other independent variables to see its effect on sustainability of PSNP-NRM projects.

According to SAS (2016), interpretation of basic components of Ologit analysis have been discussed as follows:

Iteration and log Likelihood-Logistic regression uses maximum likelihood, which is obtained by an iterative procedure. The first iteration (called iteration 0) is the log likelihood of the "null" or "empty" model; that is, a model with no predictors. At the next iteration, the predictor(s) are

included in the model. At each iteration, the log likelihood increases because the goal is to maximize the log likelihood. When the difference between successive iterations is very small, the model is said to have "converged", the iterating is stopped and the results are displayed. That last value of iteration, therefore, is called the log likelihood of the final model.

Number of observations(obs)-This is the number of observations that were used in the analysis. This number may be smaller than the total number of observations in the data set if one has missing values for any of the variables used in the logistic regression. Stata uses a list-wise deletion by default, which means that if there is a missing value for any variable in the logistic regression, the entire case will be excluded from the analysis. For this study the number of observations were 353.

LR chi2(n) -This is the likelihood ratio (LR) chi-square test. The likelihood chi-square test statistic can be calculated by hand as -2*(iteration 0- last log likelihood) i.e. minus two (i.e., -2) times the difference between the starting and ending log likelihood. The number in the parenthesis (n) indicates the number of degrees of freedom which is equal to the number of predictor variables.

Prob > chi2 -This is the probability of obtaining the chi-square statistic given that the null hypothesis is true. In other words, this is the probability of obtaining this chi-square statistic - 2*(iteration 0- last log likelihood) if there is in fact no effect of the independent variables, taken together, on the dependent variable. This is, of course, the p-value, which is compared to a critical value, perhaps 0.05 or 0.01 to determine if the overall model is statistically significant. In order the model as a whole to be statistically significant, the p-value should be less than 0.05 or 0.01 depending on the level of confidence interval taken in to account for the given research. 95% confidence interval, for example, was used for this research and the p-value should be less than 0.05 in order the model to be statistically significant for the given Ologit analysis.

Pseudo R2 -This is the pseudo R-squared. Logistic regression does not have an equivalent to the R-squared that is found in OLS regression; however, many people have tried to come up with one. There are a wide variety of pseudo-R-square statistics. Because this statistic does not mean what R-square means in OLS regression (the proportion of variance explained by the predictors), it is suggested that interpreting this statistic should be with great caution.

Dependent and Independent Variables- it appears at the top left of the regression table. The variables listed below it are the independent variables.

Coefficient(Coef.) -These are the values for the logistic regression equation for predicting the dependent variable from the independent variable. They are in log-odds units. Similar to OLS regression, the prediction equation is $\log(p/1-p) = b0 + b1*x1 + b2*x2 + b3*x3$ … where p is the probability of dependent variable, x1, x2, x3 are predictor variables, b0 is constant and b1, b2, b3, … are coefficients of the predictor variables. In this study, dependent variable is sustainability and independent variables are participations in different phases of the NRM projects. hese estimates tell you about the relationship between the independent variables and the dependent variable, where the dependent variable is on the logit scale. These estimates tell the amount of increase in the predicted log odds of independent variable that would be predicted by a 1-unit increase in the predictor, holding all other predictors constant. Note: For the independent variables which are not significant, the coefficients are not significantly different from 0, which should be taken into account when interpreting the coefficients (one should see the columns with the z-values and p-values regarding testing whether the coefficients are statistically significant). Because these coefficients are in log-odds units, they are often difficult to interpret, so they are often converted into odds ratios. One can do this by hand by exponentiating the coefficient, or by using the or option with logit command, or by using the logistic command.

constant (b0) -This is the expected value of the log-odds of independent variable when all of the predictor variables equal zero. In most cases, this is not interesting. Also, oftentimes zero is not a realistic value for a variable to take.

Std. Err. - These are the standard errors associated with the coefficients. The standard error is used for testing whether the parameter is significantly different from 0; by dividing the parameter estimate by the standard error you obtain a z-value (see the column with z-values and p-values). The standard errors can also be used to form a confidence interval for the parameter, as shown in the last two columns of Ologit analysis tables of this study.

z and **P>|z|** - These columns provide the z-value and 2-tailed p-value used in testing the null hypothesis that the coefficient (parameter) is 0. If one uses a 2-tailed test, then needs to compare each p-value to the preselected value of alpha. Coefficients having p-values less than alpha are statistically significant. For example, if you chose alpha to be 0.05, coefficients having a p-value of 0.05 or less would be statistically significant (i.e., one can reject the null hypothesis and can say that the coefficient is significantly different from 0). If one uses a 1-tailed test (i.e., one predicts

that the parameter will go in a particular direction), then one can divide the p-value by 2 before comparing it to the preselected alpha level.

[95% Conf. Interval]-This shows a 95% confidence interval for the coefficient. This is very useful as it helps to understand how high and how low the actual population value of the parameter might be. The confidence intervals are related to the p-values such that the coefficient will not be statistically significant if the confidence interval includes 0.

4.2.3.1. Analysis and Interpretation of Effect of Local Community Participation on Environmental Sustainability of PSNP-NRM Projects

As it has been discussed briefly in section 4.2.2 above, sustainability indicators are very complex and versatile. An indicator is something that helps to understand where is the current status, which way to go and how far to go from where it was and where it wants to be. Indicators of a sustainability of community projects help to identify areas where the links between the economy, environment and society are strong and/or weak. Sustainability indicators reflect the reality that the three different segments are very tightly interconnected (Maureen 2010). The tabular reports from table 4.20 to 4.26 are results of the regression analysis using the research model: ordered logistic regression.

Definition of variables in the Ologit Regression

Variables	Definitions
Local Community Participation	Extent of Local Community Participation Enhanced Sustainability of PSNP-NRM Projects
Rainfall/Moisture	Availability of Enough Moisture Enhanced Sustainability of PSNP-NRM Projects
Population Pressure	Extent of Population pressure Didn't Affect Sustainability of PSNP-NRM Projects
Free Grazing	Extent of Free Grazing Didn't Affect Sustainability of PSNP-NRM Projects
Land Degradation	Extent of Land Degradation Didn't Affect Sustainability of PSNP-NRM Projects
Deforestation	Extent of Deforestation Didn't Affect Sustainability of PSNP-NRM Projects
Soil Fertility	Availability of Good Soil Fertility Enhanced Sustainability of PSNP-NRM Projects
Dependency Syndrome	Extent of Dependency Syndrome Didn't Affect Sustainability of PSNP-NRM Projects
Natural and Manmade Disasters	Extent of Natural and Manmade Disasters didn't Affect Sustainability of PSNP-NRM Projects
Use of Charcoal and Firewood as Sources of Income and Energy	Extent of Use of Charcoal and Firewood as Sources of Income and Energy didn't Affect Sustainability of PSNP-NRM Projects
Use of Wood and Grass for Construction	Extent of Use of Wood and Grass for Construction Didn't Affect Sustainability of PSNP-NRM Projects
Availability of Alternative Energy Sources	Availability of Alternative Energy Sources Enhanced Sustainability of PSNP-NRM Projects
Rural Landholding Policy of Ethiopia	The Current Rural Landholding Policy of Ethiopia Enhanced Sustainability of PSNP-NRM Projects

Table 4.20: Effects of Local Community Participation on Environmental Sustainability, the case of <u>*"Wise-use of outcomes"*</u> *of PSNP-NRMPs in the Sample Kebeles of Gubalafto Woreda*

Iteration 0: log likelihood = -388.14518	Number of obs = 353
Iteration 1: log likelihood = -376.19988	LR chi2(13) = 23.99
Iteration 2: log likelihood = -376.14937	Prob > chi2 = 0.0312
Iteration 3: log likelihood = -376.14936	Pseudo R2 = 0.0309

Log likelihood = -376.14936

Wise-Use of PSNP-NRM Projects	Coef.	Std.Err.	z	P>|z|	[95% Conf. Interval]	
Local Community Participation	0.22	0.09	2.37	0.02	0.40	0.04
Rainfall/Moisture	0.09	0.10	0.92	0.36	-0.10	0.29
Population Pressure	0.03	0.10	0.32	0.75	-0.17	0.24
Free Grazing	-0.22	0.11	-2.09	0.04	-0.43	-0.01
Land Degradation	0.19	0.10	1.97	0.05	0.00	0.39
Deforestation	-0.07	0.11	-0.66	0.51	-0.28	0.14
Soil Fertility	-0.11	0.13	-0.83	0.41	-0.37	0.15
Dependency Syndrome	-0.22	0.12	-1.81	0.07	-0.45	0.02
Natural and Manmade Disasters	-0.04	0.10	-0.37	-0.71	-0.22	0.15
Charcoal and Firewood as Sources of Income and Energy	-0.24	0.10	-2.36	0.02	-0.44	-0.04
Use of Wood and Grass for Construction	-0.07	0.12	-0.63	0.53	-0.30	0.16
Availability of Alternative Energy Sources	-0.08	0.12	-0.71	0.48	-0.32	0.15
Rural Landholding Policy of Ethiopia	-0.01	0.11	-0.06	0.96	-0.22	0.20
/cut1	-2.75	1.09			-4.90	-0.61
/cut2	-1.35	1.09			-3.48	0.78
/cut3	1.26	1.14			-0.97	3.49

Effects of local community participation on environmental sustainability in terms of wise-use of outcomes of PSNP-NRM projects was analyzed using ordered logistics regression model. In the output above in table 4.20, first the iteration log at iteration 0 was seen, Stata fits a null model, i.e. the intercept-only model. It then moved on to fit the full model and stops the iteration process once the difference in log likelihood between successive iterations become sufficiently small. The final log likelihood was -376.14936. Though it was not the interest of this research, it could be used in comparisons of nested models. As shown on the top of the table, there were 353 observations used for this analysis. The likelihood ratio chi-square was 23.99 with a p-value of 0.0312 indicated that the model as a whole was statistically significant.

In the table, the coefficients, their standard errors, z-tests and their associated p-values, and the 95% confidence interval of the coefficients were presented. "Local Community Participation", which is the interest of this research was statistically significant. So a one-unit change in "Local Community Participation" (i.e., going from 0 to 1), the environmental sustainability increased by 0.22, given all of the other variables in the model are held constant. From the control variables

"Free Grazing", "Land Degradation", and "Use of Charcoal and Firewood as Sources of Income and Energy" were also statistically significant whereas the rest nine were not. The cut-points shown at the bottom of the output indicated where the latent variables in the observed and analyzed data were cut in to three groups.

Table 4.21: Effects of Local Community Participation on Environmental Sustainability, the case of "Sustainable Protection from any form of Destruction" of PSNP-NRMPs in the Sample Kebeles of Gubalafto Woreda

Iteration 0: log likelihood = -361.01641				Number of obs = 353		
Iteration 1: log likelihood = -349.97721				LR chi2(13) = 22.42		
Iteration 2: log likelihood = -349.80571				Prob > chi2 = 0.0492		
Iteration 3: log likelihood = -349.80559				Pseudo R2 = 0.0311		
Iteration 4: log likelihood = -349.80559						
Log likelihood = -349.80559						

Protection from any Form of Destruction of PSNP-NRM Projects	Coef.	Std.Err.	z	P>|z|	[95% Conf. Interval]	
Local Community Participation	0.03	0.10	0.32	0.75	0.22	0.16
Rainfall/Moisture	0.00	0.11	-0.03	0.97	-0.21	0.21
Population Pressure	0.24	0.11	2.15	0.03	0.02	0.47
Free Grazing	0.22	0.12	1.83	0.07	-0.02	0.45
Land Degradation	-0.20	0.11	-1.35	0.18	-0.36	0.06
Deforestation	-0.10	0.11	-0.44	0.66	-0.26	0.16
Soil Fertility	-0.10	0.14	-0.46	0.64	-0.34	0.21
Dependency Syndrome	-0.10	0.13	-0.61	0.54	-0.33	0.17
Natural and Manmade Disasters	0.02	0.10	0.16	0.87	-0.19	0.22
Charcoal and Firewood as Sources of Income and Energy	-0.20	0.11	-1.63	0.10	-0.39	0.04
Use of Wood and Grass for Construction	0.04	0.12	0.31	0.76	-0.20	0.27
Availability of Alternative Energy Sources	-0.20	0.13	-1.62	0.11	-0.48	0.05
Rural Landholding Policy of Ethiopia	0.35	0.11	3.08	0.00	0.13	0.57
/cut1	-2.9	1.18			-5.19	-0.57
/cut2	1.26	1.16			-1.00	3.53
/cut3	2.53	1.16			0.25	4.81
/cut4	4.82	1.24			2.39	7.24

Effects of local community participation on environmental sustainability in terms of protection of PSNP-NRM projects from any form of destruction was analyzed using ordered logistics regression model. In the output above in table 4.21, first the iteration log at iteration 0 was seen, Stata fits a null model, i.e. the intercept-only model. It then moved on to fit the full model and stopped the iteration process once the difference in log likelihood between successive iterations became sufficiently small. The final log likelihood was -349.80559. Though it was not the interest of this research, it could be used in comparisons of nested models. As shown on the top of the table, there

were 353 observations used for this analysis. The likelihood ratio chi-square was 22.42 with a p-value of 0.0492 indicated that the model as a whole was statistically significant.

In the table, the coefficients, their standard errors, z-tests and their associated p-values, and the 95% confidence interval of the coefficients were presented. "Local Community Participation", which is the interest of this research was not statistically significant. From the control variables "Population Pressure" and "Rural Landholding Policy of Ethiopia" were statistically significant whereas the rest ten were not. The cut-points shown at the bottom of the output indicated where the latent variables in the observed and analyzed data were cut in to four groups.

4.2.3.2.   Analysis and Interpretation of Effect of Local Community Participation on Economic Sustainability of PSNP-NRM Projects

Table 4.22: Effects of Local Community Participation on Economical Sustainability, the case of "Sustainable Increase of Productivity & Production of agriculture" due to PSNP-NRMPs in the Sample Kebeles of Gubalafto Woreda

Iteration 0:   log likelihood = -401.61096   Number of obs   = 353
Iteration 1:   log likelihood = -390.46891   LR chi2(13)   = 22.41
Iteration 2:   log likelihood = -390.40439   Prob > chi2   = 0.0493
Iteration 3:   log likelihood = -390.40437   Pseudo R2   = 0.0279
Log likelihood = -390.40437

Increase of Production & Productivity Due to PSNP-NRM Projects	Coef.	Std.Err.	z	P>|z|	[95% Conf. Interval]	
Local Community Participation	0.11	0.09	1.21	0.23	-0.07	0.28
Rainfall/Moisture	-0.16	0.10	-1.63	0.10	-0.36	0.03
Population Pressure	-0.05	0.10	-0.51	0.61	-0.26	0.15
Free Grazing	-0.07	0.11	-0.69	0.49	-0.28	0.14
Land Degradation	-0.19	0.10	-0.34	0.73	-0.23	0.16
Deforestation	-0.03	0.10	-1.91	0.06	-0.39	0.00
Soil Fertility	-0.02	0.13	-0.14	0.89	-0.27	0.23
Dependency Syndrome	-0.15	0.12	-1.27	0.20	-0.39	0.08
Natural and Manmade Disasters	-0.11	0.10	-1.18	0.24	-0.30	0.08
Charcoal and Firewood as Sources of Income and Energy	-0.06	0.10	-0.58	0.56	-0.25	0.14
Use of Wood and Grass for Construction	0.08	0.11	0.66	0.51	-0.15	0.30
Availability of Alternative Energy Sources	0.11	0.12	0.91	0.36	-0.12	0.34
Rural Landholding Policy of Ethiopia	0.36	0.12	3.08	0.00	0.13	0.59
/cut1	-6.08	1.30			-8.63	-3.54
/cut2	-3.66	1.11			-5.83	-1.49
/cut3	-2.54	1.09			-4.68	-0.39
/cut4	-0.68	1.08			-2.80	1.45

Effects of local community participation on economic sustainability in terms of increasing productivity and production due to PSNP-NRM projects was analyzed using ordered logistics regression model. In the output above in table 4.22, first the iteration log at iteration 0 was seen, Stata fits a null model, i.e. the intercept-only model. It then moved on to fit the full model and stops the iteration process once the difference in log likelihood between successive iterations become sufficiently small. The final log likelihood was -390.40437. Though it was not the interest of this research, it could be used in comparisons of nested models. As shown on the top of the table, there were 353 observations used for this analysis. The likelihood ratio chi-square was 22.41 with a p-value of 0.0493 indicated that the model as a whole was statistically significant.

In the table, the coefficients, their standard errors, z-tests and their associated p-values, and the 95% confidence interval of the coefficients were presented. "Local Community Participation", which is the interest of this research was statistically significant. So a one-unit change in "Local Community Participation" (i.e., going from 0 to 1), the environmental sustainability increased by 0.11, given all of the other variables in the model are held constant. From the control variables "Rural Landholding Policy of Ethiopia" was statistically significant whereas the rest eleven were not. The cut-points shown at the bottom of the output indicated where the latent variables in the observed and analyzed data were cut in to four groups.

Table 4.23: Effects of Local Community Participation on Economical Sustainability, the case of _"Sustainable Sales of Products/Byproducts and Services"_ created by PSNP-NRMPs in the Sample Kebeles of Gubalafto Woreda

Iteration 0: log likelihood = -517.41714	Number of obs = 353
Iteration 1: log likelihood = -513.24241	LR chi2(13) = 8.36
Iteration 2: log likelihood = -513.23721	Prob > chi2 = 0.8194
Iteration 3: log likelihood = -513.23721	Pseudo R2 = 0.0081
Log likelihood = -513.23721	

Sale of Products/byproducts of PSNP-NRM Projects	Coef.	Std.Err.	z	P>|z|	[95% Conf. Interval]	
Local Community Participation	0.02	0.09	0.21	0.83	-0.15	0.19
Rainfall/Moisture	-0.12	0.09	-1.34	0.18	-0.31	0.06
Population Pressure	0.13	0.10	1.32	0.19	-0.07	0.33
Free Grazing	0.05	0.10	0.45	0.65	-0.15	0.25
Land Degradation	0.01	0.09	0.16	0.87	-0.17	0.20
Deforestation	-0.03	0.10	-0.28	0.78	-0.22	0.16
Soil Fertility	-0.02	0.12	-0.16	0.88	-0.26	0.22
Dependency Syndrome	0.16	0.11	1.43	0.15	-0.06	0.38
Natural and Manmade Disasters	-0.08	0.09	-0.87	0.39	-0.26	0.10
Charcoal and Firewood as Sources of Income and Energy	0.00	0.09	0.00	1.00	-0.18	0.18
Use of Wood and Grass for Construction	-0.07	0.11	-0.63	0.53	-0.27	0.14
Availability of Alternative Energy Sources	0.10	0.11	0.94	0.35	-0.11	0.32
Rural Landholding Policy of Ethiopia	0.07	0.11	0.67	0.50	-0.14	0.28
/cut1	-2.23	1.02			-4.23	-0.24
/cut2	-0.63	1.00			-2.59	1.33
/cut3	0.45	1.00			-1.51	2.41
/cut4	1.19	1.00			-0.77	3.15

Effects of local community participation on economic sustainability in terms of sales of products and byproducts of PSNP-NRM projects was analyzed using ordered logistics regression model. In the output above in table 4.23, first the iteration log. at iteration 0 was seen, Stata fits a null model, i.e. the intercept-only model in no predictor variable in the model. It then moved on to fit the full model and stops the iteration process once the difference in log likelihood between successive iterations become sufficiently small. The final log likelihood was -513.23. Though it was not the interest of this research, it could be used in comparisons of nested models. As shown on the top of the table, there were 353 observations used for this analysis. The likelihood ratio chi-square was 8.36 with a p-value of 0.8194 indicated that the model as a whole was not statistically significant and so same for "Local Community Participation", which is the interest of this research and the other 12 control factors.

The cut-points shown at the bottom of the output indicated where the latent variables in the observed and analyzed data were cut in to four groups.

4.2.3.3. Analysis and Interpretation of Effect of Local Community Participation on Social Sustainability of PSNP-NRM Projects

Table 4.24: Effects of Local Community Participation on Social Sustainability, the case of "Sustainable Job Opportunity & Security" due to PSNP-NRMPs in the Sample Kebeles of Gubalafto Woreda

Iteration 0: log likelihood = -362.58229   Number of obs = 353
Iteration 1: log likelihood = -350.81543   LR chi2(13)   =   23.71
Iteration 2: log likelihood = -350.72584   Prob > chi2   = 0.0339
Iteration 3: log likelihood = -350.7258   Pseudo R2   = 0.0327
Iteration 4: log likelihood = -350.7258
Log likelihood = -350.7258

Job Security Due to PSNP-NRM Projects	Coef.	Std.Err.	z	P>|z|	[95% Conf. Interval]	
Local Community Participation	0.21	0.09	2.29	0.02	0.03	0.38
Rainfall/Moisture	-0.17	0.10	-1.70	0.09	-0.37	0.03
Population Pressure	0.14	0.11	1.33	0.18	-0.07	0.36
Free Grazing	0.01	0.11	0.06	0.95	-0.21	0.22
Land Degradation	0.13	0.10	1.33	0.18	-0.06	0.33
Deforestation	-0.02	0.10	-0.20	0.84	-0.22	0.18
Soil Fertility	-0.13	0.13	-1.01	0.31	-0.38	0.12
Dependency Syndrome	0.16	0.12	1.33	0.18	-0.08	0.40
Natural and Manmade Disasters	0.00	0.10	0.03	0.98	-0.19	0.19
Charcoal and Firewood as Sources of Income and Energy	0.04	0.10	0.44	0.66	-0.15	0.24
Use of Wood and Grass for Construction	0.11	0.11	0.93	0.35	-0.12	0.33
Availability of Alternative Energy Sources	0.37	0.12	3.07	0.00	0.13	0.61
Rural Landholding Policy of Ethiopia	0.04	0.11	0.33	0.74	-0.17	0.24
/cut1	-3.01	1.29			-5.54	-0.49
/cut2	0.66	1.09			-1.48	2.79
/cut3	3.20	1.10			1.04	5.36

Effects of local community participation on social sustainability in terms of job opportunity and security due to PSNP-NRM projects was analyzed using ordered logistics regression model. In the output above in table 4.24, the final log likelihood was -350.7258. Though it was not the interest of this research, it could be used in comparisons of nested models. As shown on the top of the table, there were 353 observations used for this analysis. The likelihood ratio chi-square was 23.71 with a p-value of 0.0339 indicated that the model as a whole was statistically significant.

In the table, the coefficients, their standard errors, z-tests and their associated p-values, and the 95% confidence interval of the coefficients were presented. "Local Community Participation", which is the interest of this research was statistically significant. So a one-unit change in "Local Community Participation" (i.e., going from 0 to 1), the environmental sustainability increased by 0.21, given all of the other variables in the model are held constant. From the control variable "Availability of Alternative Energy" was also statistically significant whereas the rest eleven were not. The cut-points shown at the bottom of the output indicated where the latent variables in the observed and analyzed data were cut in to three groups.

Table 4.25: Effects of Local Community Participation on Social Sustainability, the case of "<u>Sustainable Establishment & Running of CBOs</u>" due to PSNP-NRMPs in the Sample Kebeles of Gubalafto Woreda

Iteration 0: log likelihood = -391.77816   Number of obs   =353
Iteration 1: log likelihood = -380.20941   LR chi2(13)   =23.3
Iteration 2: log likelihood = -380.14858   Prob > chi2   = 0.0387
Iteration 3: log likelihood = -380.14856   Pseudo R2   = 0.0297
Log likelihood = -380.14856

CBOs due to PSNP-NRM Projects	Coef.	Std.Err.	z	P>|z|	[95% Conf. Interval]	
Local Community Participation	0.19	0.09	2.13	0.03	0.02	0.36
Rainfall/Moisture	-0.05	0.10	-0.46	0.65	-0.24	0.15
Population Pressure	0.17	0.11	1.55	0.12	-0.43	0.37
Free Grazing	0.08	0.11	0.75	0.46	-0.13	0.29
Land Degradation	0.17	0.10	1.69	0.09	-0.03	0.37
Deforestation	-0.01	0.10	-0.10	0.92	-0.21	0.19
Soil Fertility	-0.17	0.13	-1.32	0.19	-0.42	0.08
Dependency Syndrome	0.27	0.12	2.27	0.02	0.04	0.51
Natural and Manmade Disasters	0.03	0.09	0.32	0.75	-0.15	0.21
Charcoal and Firewood as Sources of Income and Energy	0.08	0.10	0.80	0.43	-0.11	0.27
Use of Wood and Grass for Construction	0.09	0.11	0.77	0.44	-0.14	0.31
Availability of Alternative Energy Sources	0.30	0.12	2.56	0.01	0.07	0.53
Rural Landholding Policy of Ethiopia	0.01	0.11	0.06	0.95	-0.20	0.21
/cut1	-0.43	1.11			-2.60	1.74
/cut2	1.52	1.08			-0.60	3.63
/cut3	3.80	1.10			1.65	5.95

Effects of local community participation on social sustainability in terms of establishment and running of community based organizations/CBOs/ due to PSNP-NRM projects was analyzed using ordered logistics regression model. In the output above in table 4.25, the final log likelihood was -380.14856. Though it was not the interest of this research, it could be used in comparisons of nested models. As shown on the top of the table, there were 353 observations used for this analysis. The likelihood ratio chi-square was 23.26 with a p-value of 0.0387 indicated that the model as a whole was statistically significant.

In the table, the coefficients, their standard errors, z-tests and their associated p-values, and the 95% confidence interval of the coefficients were presented. "Local Community Participation", which is the interest of this research was statistically significant. So a one-unit change in "Local Community Participation" (i.e., going from 0 to 1), the environmental sustainability increased by 0.19, given all of the other variables in the model are held constant. From the control variables "Dependency Syndrome" and "Availability of Alternative Energy" were also statistically significant whereas the rest eleven were not. The cut-points shown at the bottom of the output indicated where the latent variables in the observed and analyzed data were cut in to three groups.

Table 4.26: Effects of Local Community Participation on Social Sustainability, the case of "Sustainable Availability and Access of Social Services" due to PSNP-NRMPs in the Sample Kebeles of Gubalafto Woreda

Iteration 0: log likelihood = -507.36926   Number of obs   = 353
Iteration 1: log likelihood = -496.20924   LR chi2(13)   = 22.44
Iteration 2: log likelihood = -496.14691   Prob > chi2   = 0.0488
Iteration 3: log likelihood = -496.14689   Pseudo R2   = 0.0221
Log likelihood = -496.14689

Social Services due to PSNP-NRM Projects	Coef.	Std.Err.	z	P>|z|	[95% Conf. Interval]	
Local Community Participation	0.19	0.09	2.20	0.03	0.35	0.02
Rainfall/Moisture	0.11	0.09	1.19	0.24	-0.07	0.29
Population Pressure	-0.09	0.10	-0.88	0.38	-0.28	0.11
Free Grazing	0.22	0.10	2.13	0.03	0.02	0.42
Land Degradation	0.05	0.09	0.51	0.61	-0.14	0.23
Deforestation	-0.03	0.09	-0.29	0.78	-0.21	0.16
Soil Fertility	0.20	0.12	1.58	0.11	-0.05	0.44
Dependency Syndrome	0.16	0.12	1.36	0.18	-0.07	0.38
Natural and Manmade Disasters	0.16	0.09	1.69	0.09	-0.03	0.34
Charcoal and Firewood as Sources of Income and Energy	0.05	0.09	0.53	0.59	-0.13	0.23
Use of Wood and Grass for Construction	-0.05	0.11	-0.44	0.66	-0.26	0.16
Availability of Alternative Energy Sources	-0.12	0.12	-1.03	0.30	-0.34	0.11
Rural Landholding Policy of Ethiopia	0.18	0.10	1.72	0.09	-0.02	0.38
/cut1	-1.22	1.05			-3.29	0.84
/cut2	0.99	1.04			-1.05	3.02
/cut3	2.53	1.04			0.48	4.57
/cut4	4.16	1.06			2.08	6.23

Effects of local community participation on social sustainability in terms of availability and access of social services due to PSNP-NRM projects was analyzed using ordered logistics regression model. In the output above in table 4.26, the final log likelihood was -496.14689. Though it was not the interest of this research, it could be used in comparisons of nested models. As shown on the top of the table, there were 353 observations used for this analysis. The likelihood ratio chi-square was 22.44 with a p-value of 0.0488 indicated that the model as a whole was statistically significant.

In the table, the coefficients, their standard errors, z-tests and their associated p-values, and the 95% confidence interval of the coefficients were presented. "Local Community Participation", which is the interest of this research was statistically significant. So a one-unit change in "Local Community Participation" (i.e., going from 0 to 1), the environmental sustainability increased by 0.19, given all of the other variables in the model are held constant. From the control variable "Free Grazing" was also statistically significant whereas the rest eleven were not. The cut-points shown at the bottom of the output indicated where the latent variables in the observed and analyzed data were cut in to four groups.

CHAPTER V: FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary of Major Findings

Local community participation was limited to more of "participation for material incentive". Respondents strongly agreed for the practice of this type of participation in their respective kebeles. Only neutral to agree level of confirmation was given by the respondents to functional participation. Responses ranged from strongly disagree to disagree for the existence of the highest levels of participation namely interactive participation and self-mobilization.

Concerning participation in project phases of different projects, respondents confirmed (response ranged from agree to strongly agree) that people participated in the execution phase in all the 10 PSNP-NRM projects under this study. Good attempt was also observed in the closing phase of some of projects like potable water development, irrigation scheme development and rural roads catchment management (responses ranged from neutral to agree). However, local community participation in problem identification, planning, monitoring and evaluation phases were limited to strongly disagree to neutral levels of responses.

In relation to methods, purposes and factors affecting local community participation, this research confirmed that methods of participation were labor contribution, local materials and attending meetings. The purpose of participation was for receiving food ration in exchange of labor. Awareness levels and experiences played an important role in enhancing participation. Poor HHs who are healthy and landless youths participated in the execution phase better than other community groups. Males participated better than females. Availability of credit, push from externals and punishments of absenteeism pushed local community participation in PSNP-NRMPs. Unavailability of alternative energy sources like kerosene was not taken as a serious factor affecting sustainability due to the fact that rural communities has no purchasing power for kerosene coupled with the need of money to cover consumption gaps of the rural people by selling firewood and charcoal in one hand and due to same factor of limited purchasing power of alternative energy sources like kerosene to town people in the other hand. The best solution was electric power /cheaper and easy/ majority of rural people didn't have it and frequent interruptions in towns aggravated the problem.

As far as the sustainability indicators were concerned, except "social sustainability" through Job opportunity and security (filling food gaps of chronically food insecure households) and establishment/running of CBOs, PSNP-NRM projects lack all sustainability aspects in full

spectrum. In the aspect of "economic sustainability" performance of the indicator "increase productivity and production of agriculture" performed well/achieved/, whereas "sale of products and byproducts" was not achieved. The environmental dimension of sustainability was not fully met. Both indicators: Protection PSNP-NRM from destruction and wise use of PSNP-NRM projects scored disagree to neutral in the Likert Scale measurement of this research. Unless the three pillars of sustainability are met, one could not say that given projects have sustained (Silvius et al. 2010).

There are still egos of people. Community members prioritize short term individual benefits over long term communal benefits. Watersheds are still protected with security guards. People are not motivated to develop their own NRM activities to the required levels like private nursery developments, tree plantation, respecting of bylaws if all these didn't bring personal benefits. Evidence is people destructed many NRM projects like SWC, forests, watersheds etc… either to get immediate benefits or due to lack of ownership & lack of understanding of the long-term benefits or to facilitate tomorrows job opportunity through PSNP LBPWs on the same area.

Though the performance of area closure projects were so good so far in terms of ownership of the community, local communities were not benefited from sale of products and byproducts of those projects due to the fact that almost all area closure management projects were found at their regeneration stage and changes are slow/gradual where utilization in any form was not started yet. The start of the project was as old as 10-13 years, but regeneration of indigenous plant varieties in the closed areas seemed too slow to respond to the needs due to the effects of soil fertility, moisture stress and natural hazards.

Even though forage/fodder development was designed as a project in PSNP program with purpose of increasing animal production, respondents confirmed that the project had limited contribution to increase production and productivity of animals. Key informants justified this issue that most of the varieties were not adaptive to the environment as well as not habituated to livestock in the areas.

This research result is in contradiction to the data/report of local GoE (2010-2016) on sustainable NRM performances. The two major illustrations were seedling plantation and Physical SWC structures. According to Gubalafto Woreda Office of Agriculture annual reports, 237,840,000,000 tree seedlings were raised from 2010 to 2016 fiscal years; 224,438,000,000 were planned in those areas and 189,696,700,000 seedlings were survived, i.e. in simple arithmetic, 166 seedlings per

meter square were survived which is unjustifiable. Besides, 18,922,598,400,000 different types of trenches, micro basins, and water percolation pits were reported in the specified seven (years), i.e. it is more than 16,587 structures in one-meter square which again is unjustifiable. Yet, most were not physically found with described quantity and quality and so didn't serve the intended services as confirmed by the quantitative and qualitative data of this research.

5.2. Conclusions

Characteristics of respondents- A total PSNP beneficiaries as of 2017 were 52,508 (10,502 HHs) which accounted 27% of the total populations of the woreda. From the 10,502 PSNP HHs, 34.2% (3587 HHs) belonged to the 6 sampled kebeles. Three hundred fifty-three (353) households, which accounted about 10% of the total PSNP beneficiary HHs in the sampled kebeles were sampled as respondents of this research from whom 142 were female respondents (40%) and 211 were male respondents. In terms of HH heads, 182 of the HHs of the respondents were male headed and 171 (48.4%) were female headed HHs. Major occupation of the HH, educational level and experience in PSNP-NRM, sources of household income, sex, landholdings, food security situation/wealth status of the HH, food gap months and means to cover, health condition of the HH, availability of able bodied HH members, major production constraints and other relevant characteristics that have effect on the participation of local community on PCMs of PSNP-NRM projects.

Practices of participation- local community participation was limited to "participation for material incentives" level of participation in the execution phase of PCM. Local community participation was mostly influenced by external forces like food insecurity of the households, obligations to attend LBPWs and punishments due to absenteeism etc. than self-motives. The highest levels of participation were not exercised to the required levels. Participation of communities were less enhanced in projects basically involved seedling raising and plantation like nursery management, watershed management, biological SWC, forage/fodder plantation and managements and those projects were less successful in term of sustainability as compared to other physical projects like potable water development, irrigation scheme development, physical SWC where participation and ownership were good and sustainability was better than biological PSNP-NRM projects. Participation in PSNP-NRM projects have been significantly affected by wealth ranks of the community as indicated in PSNP-PIM 2010. Poor, healthy and landless youths participated more than other groups of HHs and were benefited from PSNP-NRM projects better than other groups. Middle groups also participated in PSNP-NRM projects better than better off groups. True participation is actualized by implementing functional and/or interactive participation

if not self- mobilization of the local community. This highest level of participation in projects to ensure ownership of the local community is characterized by involving actors starting from project initiation through planning, execution, monitoring, evaluation and closing stages/cycles of projects. In none of the 10 PSNP-NRM projects, local community were involved in all cycles of the projects, mostly communities were involved in the execution phases which didn't ensure ownership of the community (Pretty, 1995). Due to this gap sustainability of PSNP-NRM projects were questionable.

Practices of sustainability- Sustainability of physical projects like physical SWC, potable water development, and irrigation scheme development were relatively better sustained PSNP-NRM projects towards the assessed indicators of sustainability. Exception in physical projects was rain water harvesting which was the poorest of all in response to environmental and economic sustainability indicators. Whereas biological projects like tree nursery management, watershed management, fodder/forage plantation /management, and gulley treatment were relatively poorly performing projects in response to environmental and economic sustainability indicators. Exception here was area closure which was relatively good in performance towards the indicators of sustainability. Most of the projects were very good in response to social sustainability especially towards "Establishment and running of CBOs" and "job opportunity and job security". Generally, as shown in table 24, 25 and 26, sustainability is an issue in PSNP-NRM projects. The program as whole didn't satisfy the requirement of the sustainability model. All the three sustainability dimensions should be met at a time to meet requirements of model of sustainability but were not (Silvius et al., 2010). The environmental dimension of sustainability was failed when measured against the two indicators: protection from destruction (scored at 2.41) and wise-use of products and byproducts (scored at 2.73) which are disagree to neutral in the Likert Scale. In economic dimension, "sale of products/byproducts" scored 3.66 and "increase productivity/production" scored 4.23 in the Likert Scale (agree to strongly agree in the scale) and social sustainability, through establishment and running of CBOs to support projects and job opportunity for able body community members showed good results in response to local community participation. "social services" scored 3.13, "Job opportunity/security" scored 4.11 and "Establishment of and running of CBOs' scored 4.13 in the Likert scale (Neutral to agree in the scale). So, PSNP-NRM sustainability is equitable (intersections of economic and social sustainability) but not bearable (intersections of social and environmental sustainability) and viable (intersections of economic and environmental sustainability). So, it could be concluded that no PSNP-Projects have been fully

sustained, rather they have been partially sustained when measured with Silvius et al. (2010) model of sustainability. Therefore, in order to ensure sustainability, true participation of local communities in the full cycle of all projects has to be actualized given other manmade and natural factors remained unchanged.

Effect of local community participation in PCM of PSNP-NRM projects on sustainability of them- Generally speaking, the research result showed that there has been relationship between local community participation in PCM of PSNP-NRM projects (independent variable) and sustainability of those projects (dependent variable). Each indicator of pillar of sustainability showed varied results in response to variations in local community participation in PSNP-NRM project cycles as confirmed from the results of ordered logistic regression. The model as a whole has been significant against the sustainability indicators except "Sustainable Sales of Products/Byproducts and Services". Participation has been statistically significantly independent variable that could affect sustainability of PSNP-NRM projects in most of the sustainability indicators given other predictor variables that could affect sustainability of PSNP-NRM projects are held constant.

Effects of Local Community Participation on Environmental Sustainability, the case of "Wise-use of outcomes" of PSNP-NRMPs – "local community participation", which is the interest of this research was statistically significant. So, a one unit change in local community participation (i.e., going from 0 to 1), the environmental sustainability decreased by 0.22, given all of the other variables in the model are held constant.

Effects of Local Community Participation on Economical Sustainability, the case of "Sustainable Increase of Productivity & Production of agriculture" due to PSNP-NRMPs in the Sample Kebeles of Gubalafto Woreda-"Local Community Participation", which is the interest of this research was statistically significant. So a one-unit change in "Local Community Participation" (i.e., going from 0 to 1), the environmental sustainability increased by 0.11, given all of the other variables in the model are held constant.

Effects of Local Community Participation on Social Sustainability, the case of "Sustainable Job Opportunity & Security" due to PSNP-NRMPs in the Sample Kebeles of Gubalafto Woreda- "local community participation", which is the interest of this research was statistically significant. Therefore, a one unit change in local community participation (i.e., going from 0 to 1), the

environmental sustainability increased by 0.21, given all of the other variables in the model are held constant.

Effects of Local Community Participation on Social Sustainability, the case of "Sustainable Establishment & Running of CBOs" due to PSNP-NRMPs in the Sample Kebeles of Gubalafto Woreda- "local community participation", which is the interest of this research was statistically significant. So a one-unit change in local community participation (i.e., going from 0 to 1), the environmental sustainability increased by 0.19, given all of the other variables in the model are held constant.

Effects of Local Community Participation on Social Sustainability, the case of "Sustainable Availability and Access of Social Services" due to PSNP-NRMPs in the Sample Kebeles of Gubalafto Woreda- local community participation, which is the interest of this research was statistically significant. So a one-unit change in local community participation (i.e., going from 0 to 1), the environmental sustainability increased by 0.19, given all of the other variables in the model are held constant.

Unintended Result-There is incompatibility of PSNP IV-PIM revised in 2014 and National Guidelines on Targeting Relief Food Assistance of GoE authorized in 2011. The former introduced cap of 5 in PSNP registration of chronically food insecure rural households where as the later critically exclude PSNP beneficiaries at all times. The researcher learnt that one household has up to 11 family size and shocks are redundant in the study area and PSNP beneficiaries with higher family size than 5 have been found suffered from hunger especially in non-transfer periods (particular July to Sep) where no harvest is exercised and affected by green hangar. The transfer for those households was not enough even for the times where transfers are made due to reduction of family size by half or more for some HHs. This led PSNP beneficiaries unable to graduate from PSNP and unable to step in to food security/livelihood security and forced to live in a vicious circle due to recurrent asset depletion to cover food gaps. This again had burden on the natural resources management in the area, especially forests and bushes due to extended cut and sales for firewood, farm tool and construction wood to get income to fill food gaps. PSNP beneficiaries complained this and preferred to be emergency beneficiaries for many reasons like full family targeting is exercised, timely transfer, no absenteeism and ration cuts, full basket of ration, no LBPW as requirement or easy tasks if there and supported by MoU to protect beneficiaries in NGO-Woredas.

5.3. Recommendations

Strategies of projects relying on plantation of seedlings must be revised, challenges must be investigated, mitigation plans must be designed and implemented. Especially, the endogenous varieties have to be given more attention over exogenous varieties so as to get sustainable results. Evidence for this is the status of area closure projects which basically avoids contacts of people and animals and motivating regeneration of local/endogenous varieties.

GoE in collaboration with stakeholders has to design a better mechanism in capacitating implementers to increase motivation and commitment to work towards the empowerment of community towards ownership of NRM projects through active involvement in PCMs of each project. GoE should design proper methodology of participatory problem identification and planning, execution, monitoring and evaluation of NRM projects. The projects with respective methodologies need to be tested, piloted in replication of place and time, and scaling up has to be after proper evaluation of the performances of pilot projects, i.e. scaling up should be made for successful pilot projects only. Assessing the internal and external environment through Strength-Weakness-Opportunity-Threat (SWOT) analysis is very useful way of evaluating project performances and this strategy could be used as a scaling up strategy i.e. use of internal strengths to exploit external opportunities (SO), use of internal strengths to avoid or minimize the impact of external threats (ST), overcoming internal weaknesses by exploiting external opportunities (WO) and overcoming internal weaknesses and minimizing external threats (WT).

Varieties of forage/fodder has to be based on research and on farm trials. The first priority should be working on the local forage/fodder verities to increase productivities by working with local community. Indigenous technical knowledge of the farming community can plan a significant role in order externals be successful in dealing with community problems. Besides, multi-purpose tree species can play a great role given that these species are tested and proved that they fit to the specific environment and liked by animals.

Social sustainability results of this study contradicted to the research result of Belay Simane, (Nov. 2013), especially on the sustainability of CBOs which brought a question for researchers to further assess the situation by differing the methodology, place and sample size to validate, comment, or confirm this result. Besides, unlike some politicians argued, this study confirmed that GoE policy on land ownership was not owned by the farming community. This showed that the land holding

policy has been accepted by the local community. This also needs verification/validation study by diversifying the respondents like non-PSNP community members.

Solutions must be set to respond to the question "what will happen to landless youths in PSNP if the program is totally closed due to unforeseen things like donor withdrawal?" PSNP beneficiaries still depended on the income from PSNP. Unlike the strategy in the PSNP PIM (2010), graduation was no seen effective. GOE has to see effective mechanisms to make the rural community self-resilience.

Future researches are good to further investigate the relationship and effect of distribution of benefits of PSNP-NRM projects on the genuine participation of local communities in the PCMs of those projects.

Further study is required to see when area closure projects to start to respond to the economic needs of the society. Whenever one pillar was not sustained, according to Silvius et al. (2010), sustainability as a whole will be affected. This will help to ensure sustainability of those projects in the area.

On farm (closed area in full involvement of the local community) and off-farm (open area by local communities themselves) trials has to be promoted in a wider range to get plan varieties adaptive to the environment (especially for highland and low land extremes), has no adverse effect on the environment (eucalyptus affected the soil), liked by animals (fodder/forage) and accepted by the whole or majority of the community.

There is a gap in relationship of donors themselves and within government in practicing the participatory NRM policy, in fitting the policy in to the existing institutional arrangements and capacities to bring about sustainable NRM practices. This needed further research on issues related to institutional capacity and sustainability of NRM projects in effect of communities' participation in a wide range.

Researchers conducted so far on NRM focused on free mobilization works, but gave less focus on PSNP-NRM projects. It was also generalized the effects of many factors of sustainability of NRM activities all together, paying less attention to individual variables to analyze and the effect of local community participation on NRM activities against sustainability is one. Besides, the PSNP review works of GoE lacked up-to-date information and have been done in other areas of Amhara region (not in North Wollo), which lacked representation of the specific environmental contexts and would not be suffice to recommend to the PSNP-NRM project implementers in the study area on

the effect of participation in PSNP-NRM projects on the sustainability of these projects. There should be comprehensive government led quantitative research on the performance of PSNP-NRM projects all over the country in terms of environmental, economic and social sustainability by contracting a firm with the required competencies in the area.

GoE has to plan capacity building events with effective studied methodologies to local implementers to help them to understand the concept of both participation (with all its levels contextualized to the local context) and sustainability (in terms of relations and variations between pillars: environmental, economic and social sustainability) deeply that to be cascaded further to local communities and their CBOs.

GoE has to revise the National Guidelines on Targeting Relief Food Assistance of GoE in line with PSNP IV-PIM 2014 version so as to accommodate food gaps due to cap system, especially in green hunger periods and at all times to help PSNP beneficiaries not to deplete assets and come out from vicious circle of food insecurity and graduate as intended in the PSNP-PIM. This again will reduce the burden on the natural resources in the area, especially forest products.

To reduce the burden of the natural resources /specially to avoid deforestation followed by soil erosion and land degradation/ due to selling of enormous quantity of charcoal and firewood, sustainable electric power to all without interruptions is recommended by the community members attended this research process.

GoE at federal level has to plan and conduct country wide survey in quantifying the practices of NRM projects and survival rate of seedlings. Sustainability of NRM projects has to be given enough attention in initiating, supporting and facilitating scientific researches by professionals/qualified researchers and archive the report for development and academic uses. This will help researchers to step up and focus on filling gaps of sustainability rather than working on validation of data/report and NRM practices. Rewards to experts at grassroots level should be based on actual changes brought on the environment in a sustainable manner and improvements in lives and livelihoods of the local community instead of the magnitude or quantity of activities they reported as major criterion. There has to be effective and efficient M&E system. Experts should be accountable for what they reported through systematic monitoring and evaluation processes of their performances against their reports.

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APPENDICES

Appendix 1: Start Year of Each PSNP-NRM Projects in the Study Kebeles of Gubalafto Woreda

NRM Projects under Sample Kebeles	Start Year of Productive Safety Net Program-NRM Projects in Each Sampled Kebele														
	NA	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Total
Dorogibir KA	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**25**	**37**	**93**	**64**	**74**	**70**	**363**
Physical SWC	0	0	0	0	0	0	0	0	0	0	0	0	0	33	33
Biological SWC	0	0	0	0	0	0	0	0	0	0	23	10	0	0	33
Gulley Treatment	0	0	0	0	0	0	0	0	3	26	4	0	0	0	33
Nursery Mgmt.	0	0	0	0	0	0	0	0	22	11	0	0	0	0	33
Forage Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	29	4	33
Potable Water Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	33	0	33
Rural Roads Catchment Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	0	33	33
Irrig. Scheme Dev't.	0	0	0	0	0	0	0	0	0	0	0	21	12	0	33
Area Closure Mgmt.	0	0	0	0	0	0	0	0	0	0	33	0	0	0	33
Rain Water Mgmt.	0	0	0	0	0	0	0	0	0	0	0	33	0	0	33
Watershed Mgmt.		0	0	0	0	0	0	0	0	0	33	0	0	0	33
Jarssa KA	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**1446**	**65**	**103**	**35**	**138**	**506**
Physical SWC	0	0	0	0	0	0	0	0	0	0	0	0	0	46	46
Biological SWC	0	0	0	0	0	0	0	0	0	0	0	11	35	0	46
Gulley Treatment	0	0	0	0	0	0	0	0	7	39	0	0	0	0	46
Nursery Mgmt.	0	0	0	0	0	0	0	0	12	34	0	0	0	0	46
Forage Mgmt.	0	0	0	0	0	0	0	0	0	0	0	46	0	0	46
Potable Water Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	0	46	46
Rural Roads Catchment Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	0	46	46

														Total
Irrig. Scheme Dev't.	0	0	0	0	0	0	0	0	0	0	0	18	28	0	46
Area Closure Mgmt.	0	0	0	0	0	0	0	0	0	0	46	0	0	0	46
Rain Water Mgmt.	0	0	0	0	0	0	0	0	0	0	0	46	0	0	46
Watershed Mgmt.		0	0	0	0	0	0	0	0	27	19	0	0	0	46
Gedober KA	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**17**	**30**	**0**	**47**	**19**	**59**	**345**	**517**
Physical SWC	0	0	0	0	0	0	0	0	0	0	0	0	0	47	47
Biological SWC	0	0	0	0	0	0	0	0	0	0	0	2	15	30	47
Gulley Treatment	0	0	0	0	0	0	0	0	0	0	0	0	14	33	47
Nursery Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	0	47	47
Forage Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	13	34	47
Potable Water Mgmt.	0	0	0	0	0	0	0	0	0	0	47	0	0	0	47
Rural Roads Catchment Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	0	47	47
Irrig. Scheme Dev't.	0	0	0	0	0	0	0	0	0	0	0	0	1	46	47
Area Closure Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	17	30	47
Rain Water Mgmt.	0	0	0	0	0	0	0	0	0	0	0	17	0	30	47
Watershed Mgmt.	0	0	0	0	0	0	0	17	30	0	0	0	0	0	47
Woynye	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**80**	**0**	**96**	**113**	**591**	**880**
Physical SWC	0	0	0	0	0	0	0	0	0	0	0	0	0	80	80
Biological SWC	0	0	0	0	0	0	0	0	0	0	0	17	18	45	80
Gulley Treatment	0	0	0	0	0	0	0	0	0	0	0	0	33	47	80
Nursery Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	15	65	80
Forage Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	27	53	80
Potable Water Mgmt.	0	0	0	0	0	0	0	0	0	80	0	0	0	0	80
Rural Roads Catchment Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	0	80	80
Irrig. Scheme Dev't.	0	0	0	0	0	0	0	0	0	0	0	0	0	80	80
Area Closure Mgmt.	0	0	0	0	0	0	0	0	0	0	0	25	6	49	80

Rain Water Mgmt.	0	0	0	0	0	0	0	0	0	0	0	33	0	47	80
Watershed Mgmt.	0	0	0	0	0	0	0	0	0	0	0	21	14	45	80
AhunTegegn	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**38**	**203**	**165**	**573**	**979**
Physical SWC	0	0	0	0	0	0	0	0	0	0	0	0	0	89	89
Biological SWC	0	0	0	0	0	0	0	0	0	0	0	8	31	50	89
Gulley Treatment	0	0	0	0	0	0	0	0	0	0	0	25	14	50	89
Nursery Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	30	59	89
Forage Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	39	50	89
Potable Water Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	0	89	89
Rural Roads Catchment Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	0	89	89
Irrig. Scheme Dev't.	0	0	0	0	0	0	0	0	0	0	0	70	19	0	89
Area Closure Mgmt.	0	0	0	0	0	0	0	0	0	0	38	41	10	0	89
Rain Water Mgmt.	0	0	0	0	0	0	0	0	0	0	0	37	0	52	89
Watershed Mgmt.	0	0	0	0	0	0	0	0	0	0	0	22	22	45	89
Kossoamba	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**31**	**27**	**0**	**50**	**30**	**500**	**638**
Physical SWC	0	0	0	0	0	0	0	0	0	0	0	0	0	58	58
Biological SWC	0	0	0	0	0	0	0	0	0	0	0	0	4	54	58
Gulley Treatment	0	0	0	0	0	0	0	0	0	0	0	1	3	54	58
Nursery Mgmt.	0	0	0	0	0	0	0	0	31	27	0	0	0	0	58
Forage Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	4	54	58
Potable Water Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	0	58	58
Rural Roads Catchment Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	0	58	58
Irrig. Scheme Dev't.	0	0	0	0	0	0	0	0	0	0	0	45	13	0	58
Area Closure Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	0	58	58
Rain Water Mgmt.	0	0	0	0	0	0	0	0	0	0	0	4	0	54	58
Watershed Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	6	52	58

Total															Total
Physical SWC	0	0	0	0	0	0	0	0	0	0	0	0	0	353	353
Biological SWC	0	0	0	0	0	0	0	0	0	0	23	48	103	179	353
Gulley Treatment	0	0	0	0	0	0	0	0	10	65	4	26	64	184	353
Nursery Mgmt.	0	0	0	0	0	0	0	0	65	72	0	0	45	171	353
Forage Mgmt.	0	0	0	0	0	0	0	0	0	0	0	46	112	195	353
Potable Water Mgmt.	0	0	0	0	0	0	0	0	0	80	47	0	33	193	353
Rural Roads Catchment Mgmt.	0	0	0	0	0	0	0	0	0	0	0	0	0	353	353
Irrig. Scheme Dev't.	0	0	0	0	0	0	0	0	0	0	0	154	73	126	353
Area Closure Mgmt.	0	0	0	0	0	0	0	0	0	0	117	66	33	137	353
Rain Water Mgmt.	0	0	0	0	0	0	0	0	0	0	0	170	0	183	353
Water shed Mgmt.	0	0	0	0	0	0	0	17	30	27	52	43	42	142	353

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Appendix 2: Summary of Levels of Community participation in the Phases of PSNP-NRM projects in the Study Area

PSNP-NRM Projects	Rate at Different Phases																								
	Project Initiation					Project Planning					Project Execution					Project Monitoring & Controlling					Project Closing				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1. Physical & Biological SWC																									
1.1.Community Pretense, with nominated representatives having no legitimacy or power **(Manipulative Participation/false participation)** in PSNP-NRM Projects	0	0	3	245	105	3	0	9	250	91	200	141	4	3	5	1	20	78	177	77	143	102	100	3	5
1.2.Unilateral announcements of externals without listening to people's responses **(passive participation)**	1	7	53	242	50	2	16	67	260	8	241	100	4	3	5	9	23	59	245	17	60	240	45	5	3
1.3.External agents define problems and information-gathering processes and so control analysis **(Consultative participation)** in PSNP-NRM Projects	2	14	45	237	55	2	18	65	261	7	202	139	4	3	5	46	0	22	268	17	0	300	45	6	2
1.4. People participate by contributing resources (labor) in return for material incentives /payments/ **(Participation for Material Incentives)** in PSNP-NRM Projects	1	0	46	239	67	0	0	88	254	11	1	1	7	233	111	46	13	209	68	17	0	3	46	299	5
1.5. External agencies encourage participation to meet predetermined objectives of the community **(Functional Participation)** in PSNP-NRM Projects	7	9	11	271	55	0	0	28	288	37	1	1	7	243	101	47	14	33	242	17	0	4	57	288	4
1.6. People participate (as a right) in joint analysis, development of action plans and formation or strengthening of local institutions **(Interactive participation)** in PSNP-NRM Projects	50	297	6	0	0	50	297	6	0	0	50	297	6	0	0	50	297	6	0	0	50	297	6	0	0
1.7. People take initiatives independently of external institutions to change systems **(Self-Mobilization/True participation)** in PSNP-NRM Projects	146	158	49	0	0	146	158	49	0	0	146	158	49	0	0	146	158	49	0	0	146	158	49	0	0
2. Gulley Treatment																									
2.1.Community Pretense, with nominated representatives having no legitimacy or power **(Manipulative Participation/false participation)** in PSNP-NRM Projects	0	0	0	246	107	6	0	8	248	91	188	153	7	0	5	1	20	78	177	77	143	198	4	3	5

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25
2.2. Unilateral announcements of externals without listening to people's responses **(passive participation)**	1	7	53	242	50	2	16	67	260	8	200	141	4	3	5	9	23	59	245	17	60	240	45	5	3
2.3. External agents define problems and information-gathering processes and so control analysis **(Consultative participation)** in PSNP-NRM Projects	2	6	53	237	55	2	16	24	303	8	211	133	4	0	5	46	0	22	268	17	0	300	45	6	2
2.4. People participate by contributing resources (labor) in return for material incentives /payments/ **(Participation for Material Incentives)** in PSNP-NRM Projects	1	0	46	239	67	0	0	88	254	11	1	1	7	233	111	46	13	209	68	17	0	3	46	299	5
2.5. External agencies encourage participation to meet predetermined objectives of the community **(Functional Participation)** in PSNP-NRM Projects	0	0	47	245	61	0	0	88	254	11	1	1	19	233	99	59	2	33	242	17	0	3	55	290	5
2.6. People participate (as a right) in joint analysis, development of action plans and formation or strengthening of local institutions **(Interactive participation)** in PSNP-NRM Projects	34	288	31	0	0	22	300	21	9	1	23	299	12	19	0	55	263	35	0	0	30	289	34	0	0
2.7. People take initiatives independently of external institutions to change systems **(Self-Mobilization/True participation)** in PSNP-NRM Projects	122	167	64	0	0	122	167	64	0	0	122	167	64	0	0	122	167	64	0	0	122	167	64	0	0

3. Nursery management

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25
3.1. Community Pretense, with nominated representatives having no legitimacy or power **(Manipulative Participation/false participation)** in PSNP-NRM Projects	6	2	8	231	106	6	0	0	258	89	246	101	1	0	5	1	11	87	107	147	143	198	4	3	5
3.2. Unilateral announcements of externals without listening to people's responses **(passive participation)**	1	7	53	242	50	2	16	67	260	8	200	141	4	3	5	9	23	59	245	17	60	240	45	5	3
3.3. External agents define problems and information-gathering processes and so control analysis **(Consultative participation)** in PSNP-NRM Projects	2	6	53	237	55	2	16	67	260	8	200	141	4	3	5	46	0	22	268	17	0	300	45	6	2
3.4. People participate by contributing resources (labor) in return for material incentives /payments/ **(Participation for Material Incentives)** in PSNP-NRM Projects	1	0	46	239	67	0	0	88	254	11	1	1	7	233	111	46	13	209	68	17	0	3	46	299	5
3.5. External agencies encourage participation to meet predetermined objectives of the community **(Functional Participation)** in PSNP-NRM Projects	1	0	46	245	61	0	0	88	254	11	1	1	18	233	100	58	14	22	242	17	0	3	46	299	5

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25
3.6. People participate (as a right) in joint analysis, development of action plans and formation or strengthening of local institutions **(Interactive participation)** in PSNP-NRM Projects	55	292	6	0	0	44	303	6	0	0	22	297	34	0	0	50	297	6	0	0	78	272	3	0	0
3.7. People take initiatives independently of external institutions to change systems **(Self-Mobilization/True participation)** in PSNP-NRM Projects	97	158	88	10	0	77	178	68	30	0	63	158	121	11	0	107	148	66	32	0	100	161	82	2	8
4. Forage/fodder Planation and management																									
4.1. Community Pretense, with nominated representatives having no legitimacy or power **(Manipulative Participation/false participation)** in PSNP-NRM Projects	0	0	3	245	105	3	0	9	250	91	200	141	4	3	5	1	20	78	177	77	143	198	4	3	5
4.2. Unilateral announcements of externals without listening to people's responses **(passive participation)**	1	7	53	242	50	2	16	67	260	8	200	141	4	3	5	9	23	59	245	17	60	240	45	5	3
4.3. External agents define problems and information-gathering processes and so control analysis **(Consultative participation)** in PSNP-NRM Projects	2	6	53	237	55	2	16	67	260	8	200	141	4	3	5	46	0	22	268	17	0	300	45	6	2
4.4. People participate by contributing resources (labor) in return for material incentives /payments/ **(Participation for Material Incentives)** in PSNP-NRM Projects	1	0	46	239	67	0	0	88	254	11	1	1	7	233	111	46	13	209	68	17	0	3	46	299	5
4.5. External agencies encourage participation to meet predetermined objectives of the community **(Functional Participation)** in PSNP-NRM Projects	3	5	33	251	61	3	5	33	251	61	3	5	33	251	61	3	5	33	251	61	3	5	33	251	61
4.6. People participate (as a right) in joint analysis, development of action plans and formation or strengthening of local institutions **(Interactive participation)** in PSNP-NRM Projects	63	271	6	13	0	78	273	2	0	0	76	271	6	0	0	50	284	6	13	0	301	33	8	11	0
4.7. People take initiatives independently of external institutions to change systems **(Self-Mobilization/True participation)** in PSNP-NRM Projects	122	178	51	2	0	144	209	0	0	0	101	158	93	1	0	146	158	49	0	0	146	158	49	0	0
5. Watershed mgmt.																									
5.1. Community Pretense, with nominated representatives having no legitimacy or power **(Manipulative Participation/false participation)** in PSNP-NRM Projects	1	1	9	241	101	7	1	9	250	86	200	141	4	3	5	1	20	78	177	77	143	198	4	3	5
5.2. Unilateral announcements of	1	7	53	24	50	2	16	67	26	8	19	14	4	3	5	9	23	59	4	17	60	24	45	5	3

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Indicator																									
externals without listening to people's responses (**passive participation**)																									
5.3. External agents define problems and information-gathering processes and so control analysis (**Consultative participation**) in PSNP-NRM Projects	2	15	44	237	55	11	16	67	251	8	200	141	4	3	5	46	0	22	268	17	0	300	45	6	2
5.4. People participate by contributing resources (labor) in return for material incentives /payments/ (**Participation for Material Incentives**) in PSNP-NRM Projects	1	0	46	239	67	0	0	88	254	11	1	1	7	233	111	46	13	209	68	17	0	3	46	299	5
5.5. External agencies encourage participation to meet predetermined objectives of the community (**Functional Participation**) in PSNP-NRM Projects	2	5	42	243	61	2	0	33	305	13	1	1	7	204	140	47	14	33	242	17	0	3	90	255	5
5.6. People participate (as a right) in joint analysis, development of action plans and formation or strengthening of local institutions (**Interactive participation**) in PSNP-NRM Projects	51	278	24	0	0	44	304	5	0	0	61	286	6	0	0	77	270	1	5	0	63	289	1	0	0
5.7. People take initiatives independently of external institutions to change systems (**Self-Mobilization/True participation**) in PSNP-NRM Projects	159	145	33	11	5	153	165	35	0	0	177	125	51	0	0	111	167	55	14	6	156	168	29	0	0
6. Area closure																									
6.1. Community Pretense, with nominated representatives having no legitimacy or power (**Manipulative Participation/false participation**) in PSNP-NRM Projects	55	245	53	0	0	55	245	53	0	0	200	141	4	3	5	202	139	0	7	5	143	198	4	3	5
6.2. Unilateral announcements of externals without listening to people's responses (**passive participation**)	10	245	98	0	0	58	245	50	0	0	200	141	4	3	5	199	142	0	7	5	155	186	4	3	5
6.3. External agents define problems and information-gathering processes and so control analysis (**Consultative participation**) in PSNP-NRM Projects	0	245	100	8	0	9	244	100	0	0	200	141	4	3	5	202	139	0	7	5	143	198	4	3	5
6.4. People participate by contributing resources (labor) in return for material incentives /payments/ (**Participation for Material Incentives**) in PSNP-NRM Projects	1	0	46	239	67	0	0	88	254	11	1	1	7	233	111	46	13	22	255	17	0	3	46	299	5
6.5. External agencies encourage participation to meet predetermined objectives of the community (**Functional Participation**) in PSNP-NRM Projects	0	3	44	243	63	0	0	67	265	21	1	0	7	208	137	45	13	22	255	18	0	3	55	308	5

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Indicator																									
6.6. People participate (as a right) in joint analysis, development of action plans and formation or strengthening of local institutions **(Interactive participation)** in PSNP-NRM Projects	54	206	76	17	0	41	297	15	0	0	22	288	43	0	0	33	254	64	2	0	65	266	22	0	0
6.7. People take initiatives independently of external institutions to change systems **(Self-Mobilization/True participation)** in PSNP-NRM Projects	89	255	9	0	0	106	122	125	0	0	176	128	49	0	0	162	136	55	0	0	111	168	74	0	0

7. Rain water harvesting

Indicator																									
7.1. Community Pretense, with nominated representatives having no legitimacy or power **(Manipulative Participation/false participation)** in PSNP-NRM Projects	0	3	3	222	125	3	0	9	250	91	101	233	11	3	5	1	20	78	177	77	143	198	4	3	5
7.2. Unilateral announcements of externals without listening to people's responses **(passive participation)**	1	7	53	242	50	2	16	67	260	8	200	141	4	3	5	9	23	59	245	17	60	240	45	5	3
7.3. External agents define problems and information-gathering processes and so control analysis **(Consultative participation)** in PSNP-NRM Projects	2	6	53	237	55	2	16	67	260	8	200	141	4	3	5	46	0	22	268	17	0	300	45	6	2
7.4. People participate by contributing resources (labor) in return for material incentives /payments/ **(Participation for Material Incentives)** in PSNP-NRM Projects	1	0	77	265	10	0	0	44	290	19	1	1	6	222	123	46	13	209	68	17	0	3	41	301	8
7.5. External agencies encourage participation to meet predetermined objectives of the community **(Functional Participation)** in PSNP-NRM Projects	4	5	38	251	55	0	0	65	278	10	1	1	7	187	157	47	14	44	231	17	0	3	56	289	5
7.6. People participate (as a right) in joint analysis, development of action plans and formation or strengthening of local institutions **(Interactive participation)** in PSNP-NRM Projects	66	274	13	0	0	54	279	20	0	0	68	283	2	0	0	39	311	3	0	0	52	267	34	0	0
7.7. People take initiatives independently of external institutions to change systems **(Self-Mobilization/True participation)** in PSNP-NRM Projects	109	202	42	0	0	132	168	45	8	0	165	158	30	0	0	127	176	50	0	0	123	169	55	6	0

8. Potable water development

Indicator																									
8.1. Community Pretense, with nominated representatives having no legitimacy or power **(Manipulative Participation/false participation)** in PSNP-NRM Projects	43	258	52	0	0	49	251	53	0	0	208	133	4	3	5	202	140	0	6	5	143	198	4	3	5

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Statement	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
8.2. Unilateral announcements of externals without listening to people's responses **(passive participation)**	15	240	98	0	0	69	245	39	0	0	222	121	2	3	5	199	142	0	7	5	155	186	4	3	5
8.3. External agents define problems and information-gathering processes and so control analysis **(Consultative participation)** in PSNP-NRM Projects	42	201	97	13	0	45	198	110	0	0	200	141	4	3	5	202	139	0	7	5	143	198	4	3	5
8.4. People participate by contributing resources (labor) in return for material incentives /payments/ **(Participation for Material Incentives)** in PSNP-NRM Projects	1	4	32	244	72	0	0	77	244	32	1	1	7	255	89	37	13	22	264	17	0	3	45	300	5
8.5. External agencies encourage participation to meet predetermined objectives of the community **(Functional Participation)** in PSNP-NRM Projects	11	3	33	233	73	0	0	79	263	11	1	1	7	209	135	46	13	27	255	12	5	3	41	303	1
8.6. People participate (as a right) in joint analysis, development of action plans and formation or strengthening of local institutions **(Interactive participation)** in PSNP-NRM Projects	54	202	91	6	0	46	292	1	14	0	32	287	21	13	0	33	278	42	0	0	65	266	22	0	0
8.7. People take initiatives independently of external institutions to change systems **(Self-Mobilization/True participation)** in PSNP-NRM Projects	129	188	36	0	0	131	101	121	0	0	176	144	33	0	0	162	169	22	0	0	111	168	74	0	0

9. Irrigation scheme dev't

Statement	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
9.1. Community Pretense, with nominated representatives having no legitimacy or power **(Manipulative Participation/false participation)** in PSNP-NRM Projects	67	268	18	0	0	56	277	20	0	0	204	138	3	3	5	202	139	0	7	5	143	198	4	3	5
9.2. Unilateral announcements of externals without listening to people's responses **(passive participation)**	19	254	80	0	0	78	265	10	0	0	178	163	4	3	5	199	142	0	7	5	155	186	4	3	5
9.3. External agents define problems and information-gathering processes and so control analysis **(Consultative participation)** in PSNP-NRM Projects	0	245	100	8	0	9	244	100	0	0	200	141	4	3	5	202	139	0	7	5	143	198	4	3	5
9.4. People participate by contributing resources (labor) in return for material incentives /payments/ **(Participation for Material Incentives)** in PSNP-NRM Projects	1	6	40	222	84	0	0	71	263	19	9	3	7	225	109	44	13	22	257	17	0	3	39	306	5
9.5. External agencies encourage participation to meet predetermined objectives of the community **(Functional Participation)** in PSNP-NRM Projects	0	0	47	250	56	0	0	85	259	9	1	3	7	227	115	46	13	22	255	17	0	13	27	308	5

9.6. People participate (as a right) in joint analysis, development of action plans and formation or strengthening of local institutions (**Interactive participation**) in PSNP-NRM Projects	20	206	127	0	0	41	297	15	0	0	22	317	14	0	0	33	277	43	0	0	65	266	22	0	0
9.7. People take initiatives independently of external institutions to change systems (**Self-Mobilization/True participation**) in PSNP-NRM Projects	126	150	69	8	0	106	122	125	0	0	176	128	49	0	0	162	142	44	5	0	111	168	74	0	0

10. Rural roads catchment management

10.1. Community Pretense, with nominated representatives having no legitimacy or power (**Manipulative Participation/false participation**) in PSNP-NRM Projects	1	1	4	241	106	2	1	4	255	91	195	135	15	3	5	1	20	78	177	77	143	198	4	3	5
10.2. Unilateral announcements of externals without listening to people's responses (**passive participation**)	1	7	53	242	50	2	16	67	260	8	194	147	4	3	5	9	23	64	240	17	65	235	50	0	3
10.3. External agents define problems and information-gathering processes and so control analysis (**Consultative participation**) in PSNP-NRM Projects	2	6	53	237	55	2	16	67	260	8	198	143	4	3	5	55	0	22	259	17	0	300	45	6	2
10.4. People participate by contributing resources (labor) in return for material incentives /payments/ (**Participation for Material Incentives**) in PSNP-NRM Projects	5	2	40	230	76	0	0	95	247	11	1	1	7	223	121	46	13	209	68	17	0	15	23	310	5
10.5. External agencies encourage participation to meet predetermined objectives of the community (**Functional Participation**) in PSNP-NRM Projects	3	3	41	255	51	0	0	55	287	11	1	1	5	268	78	45	12	33	242	21	0	3	57	288	5
10.6. People participate (as a right) in joint analysis, development of action plans and formation or strengthening of local institutions (**Interactive participation**) in PSNP-NRM Projects	54	293	6	0	0	57	296	0	0	0	49	301	3	0	0	46	299	8	0	0	65	287	1	0	0
10.7. People take initiatives independently of external institutions to change systems (**Self-Mobilization/True participation**) in PSNP-NRM Projects	143	161	44	5	0	134	171	48	0	0	142	162	47	2	0	156	148	39	5	5	144	169	40	0	0

Appendix 3: Different Afforestation Practices in Gubalafto Woreda

ከ2003 አስከ 2009 ዓ.ም የተከናወኑ የደን አግሮፎረስትሪ መሰረታዊ መረጃ

ተ/ቁ	ዝርዝር ተግባራት	መለኪያ	2003 ዕቅድ	2003 ክንውን	2004 ዕቅድ	2004 ክንውን	2005 ዕቅድ	2005 ክንውን	2006 ዕቅድ	2006 ክንውን	2007 ዕቅድ	2007 ክንውን	2008 ዕቅድ	2008 ክንውን	2009 ዕቅድ	2009 ክንውን	ድምር ዕቅድ	ድምር ክንውን	%
1	የተፈላ ችግኝ በሚሊዮን ቁጥር	ቁጥር	26	25.6	26	25.12	35	30.99	36.59	35.6	44	42.65	42	39	38.3	38.88	247.89000000	237.8400000	96%
2	ከተፈላዉ የተተከለ በሚሊዮን ቁጥር	ቁጥር	25.6	25	24.1	24	31.07	30.52	36.5	35.44	39.2	39.85	35	33.198	34.4	36.43	225.87000000	224.4380000	99%
3	ከተተከለዉ የፀደቀ በሚሊዮን ቁጥር	ቁጥር	16.65	14.5	19.76	18.9	24.9	23.22	36.5	33.7	39.85	35.434	33.198	31.52	36.43	32.4227	207.28000000	189.6967000	92%
4	በፀደቀዉ ችግኝ በደን የተሸፈነ መሬት ስፋት	ሄ/ር	3029.2	2896	2725	2510	4073.5	3752	4119.9	4051	7664.78	6833.85	7442	7398.55	7183.09	6392.9501	36237.47	33834.35	93%
5	ወረዳዉ የደረሰበት የደን ሽፋን መጠን	ሄ/ር	8882	8447.7	10928	9928	12408	11368.8	13948	12553	15368.9	14033.4	16007.15	15513.68	17900	17350.08	17900.00	17350.08	97%
		%	9	8.56	11	10.06	12.57	11.52	14.13	12.72	15.57	14.22	16.22	15.72	18.14	17.58	18.14	17.58	97%
6	በጥምር ደን ልማት የተሳተፉ አ/አደሮች	ቁጥር	1421	1352	1748	1588	1985	1819.008	2232	2008	2459.024	2245.344	2561	2482	710	693	13116.73	12188.13	93%
	ወንድ	ቁጥር	1378	1311	1696	1541	1926	1764	2165	1948	2385	2178	2484	2408	685	675	12720	11825	93%
	ሴት	ቁጥር	43	41	52	48	60	55	67	60	74	67	77	74	25	18	397	363	91%
	ድምር	ቁጥር	1421	1352	1748	1588	1985	1819	2232	2008	2459	2245	2561	2482	710	693	13117	12188	93%
7	በጥምር የለማ መሬት ስፋት	ሄ/ር	177.64	168.954	218.56	198.56	248.16	227.376	278.96	251.06	307.378	280.668	320.143	310.2736	86.6	68.14	1637.44	1505.03	92%
8	በሰዉ ሰራሽ ደን የተሸፈነ መሬት ስፋት	ሄ/ር	1509.94	1436.109	1857.76	1687.76	2109.36	1932.696	2371.16	2134.01	2612.713	2385.678	2721.216	2637.326	2864	2715	16046.15	14928.58	93%
9	በተፈጥሮ ደን የተሸፈነ መሬት ስፋት	ሄ/ር	2131.68	2027.448	2622.72	2382.72	2977.92	2728.512	3347.52	3012.72	3688.536	3368.016	3841.716	3723.283	4117	3911	22727.09	21153.70	93%
10	በማህበራት ደን የተሸፈነ መሬት ስፋት	ሄ/ር	133.23	126.7155	163.92	162.46	186.12	170.532	209.22	188.295	230.5335	220	240.1073	232	2183	2082.9	3346.13	3182.90	95%
11	በግል ደን የተሸፈነ መሬት ስፋት	ሄ/ር	1423.724	4054.896	5245.44	4765.44	5955.84	5457.024	6695.04	6025.44	7377.072	6736.032	7683.432	7446.566	2563.9	2629.04	36944.45	37114.44	100%
12	በተቋማት ደን የተሸፈነ መሬት ስፋት	ሄ/ር	71.056	67.5816	87.424	79.424	99.264	90.9504	111.584	100.424	122.9512	112.2672	128.0572	124.1094	162	162	782.34	736.76	94%
13	በወረዳዉ ጨቅላላ ለደን ልማት የተጠና መሬት ስፋት	ሄ/ር	8882	8447.7	10928	9928	12408	11368.8	13948	12553	15368.9	14033.4	16007.15	15513.68	17900	17350.08	17900.00	17350.08	97%
14	ከጠቅላላ ጥናቱ በአመቱ የለማ መሬት ስፋት	ሄ/ር	3029.2	2896	2725	2510	4073.5	3752	4119.9	4051	7664.78	6833.85	7442	7398.55	8008	6843.8466	37062.38	34285.25	93%
15	ወደፊት መለማት የሚችል መሬት	ሄ/ር	5852.8	5551.7	8203	7418	8334.5	7616.8	9828.1	8502	7704.12	7199.55	8565.151	8115.13	9892	10506.233	58379.67	54909.41	
16	ችግኝ አፍልቶ በመሸጥ የስራ እድልየተተፈረጠረላቸዉ	ቁጥር	568	541	699	635	3050	2984	2045	1663	604	405	1000	1071	500	788	8467	8087	96%
	ወንድ	ቁጥር	557	530	685	623	2989	2924	2004	1630	592	397	980	1050	400	670	8208	7823	95%
	ሴት	ቁጥር	11	11	14	13	61	60	41	33	12	8	20	41	100	118	259	284	109%
	ድምር	ቁጥር	568	541	699	635	3050	2984	2045	1663	604	405	1000	1091	500	788	8467	8107	96%
	የተገኘ ገቢ	ብር	835618.56	794759.62	1028106	934026.2	3355000	3282400	2249500	1829300	664400	445500	1100000	1178100	2525630	1798655	11758254.80	10262740.86	87%

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#		ክፍል	ቁጥር																	%
17	ዘፍተ ተክሉ በመሻጥ የስራ እድል	ቁጥር	853	811	1049	953	1191	1091	1339	1205	1475	1347	1537	1489	38838	30808	46282	37705	81%
	ወንድ	ቁጥር	827	787	1018	924	1155	1059	1299	1169	1431	1307	1491	1445	36955	29680	44176	36370	82%
	ሴት	ቁጥር	26	24	31	29	36	33	40	36	44	40	46	45	1883	1128	2106	1335	63%
	ድምር	ቁጥር	853	811	1049	953	1191	1091	1339	1205	1475	1347	1537	1489	38838	30808	46282	37705	81%
	የተገኘ ገቢ	ብር	3837024	3649406.4	4720896	4288896	5360256	4911322	6025536	5422896	6639365	6062428.8	6915089	6701910	15535200	12323202	49033366.03	43360060.56	88%
18	ማጠቃለያ																		
1	የተፈላ ችግኝ በሚሊዮን ቁጥር	ቁጥር	26	25.6	26	25.12	35	30.99	36.59	35.6	44	42.65	42	39	38.3	38.88	247.89	237.84	96%
2	ከተፈላዉ የተተከለ በሚሊዮን ቁጥር	ቁጥር	25.6	25	24.1	24	31.07	30.52	36.5	35.44	39.2	39.85	35	33.198	34.4	36.43	225.87	224.438	99%
3	ከተተከለዉ የፀደቀ በሚሊዮን ቁጥር	ቁጥር	16.65	14.5	19.76	18.9	24.9	23.22	36.5	33.7	39.85	35.434	33.198	31.52	36.43	32.4227	207.288	189.6967	92%
4	በፀደቀ ችግኝ በደን የተሸፈነ መሬት ስፋት	ሄ/ር	3029.2	2896	2725	2510	4073.5	3752	4119.9	4051	7664.78	6833.85	7442	7398.55	7183.09	6392.95	36237.47	33834.3501	93%
5	በጥምር የለማ መሬት ስፋት	ሄ/ር	177.64	168.954	218.56	198.56	248.16	227.376	278.96	251.06	307.378	280.668	320.143	310.2736	86.6	68.14	1637.44102	1505.0316	92%
6	በሰዉ ሰራሽ ደን የተሸፈነ መሬት ስፋት	ሄ/ር	1509.94	1436.109	1857.76	1687.76	2109.36	1932.696	2371.16	2134.01	2612.713	2385.678	2721.216	2637.326	2864	2715	16046.14867	14928.5786	93%
7	በተፈጥሮ ደን የተሸፈነ መሬት ስፋት	ሄ/ር	2131.68	2027.448	2622.72	2382.72	2977.92	2728.512	3347.52	3012.72	3688.536	3368.016	3841.716	3723.283	4117	3911	22727.09224	21153.6992	93%
8	በማህበራት ደን የተሸፈነ መሬት ስፋት	ሄ/ር	133.23	126.7155	163.92	162.46	186.12	170.532	209.22	188.295	230.5335	220	240.1073	232	2183	2082.9	3346.130765	3182.9025	95%
9	በግል ደን የተሸፈነ መሬት ስፋት	ሄ/ር	1423.724	4054.896	5245.44	4765.44	5955.84	5457.024	6695.04	6025.44	7377.072	6736.032	7683.432	7446.566	2563.9	2629.04	36944.44848	37114.4384	100%
10	በቁጥጥት ደን የተሸፈነ መሬት ስፋት	ሄ/ር	71.056	67.5816	87.424	79.424	99.264	90.9504	111.584	100.424	122.9512	112.2672	128.0572	124.1094	162	162	782.336408	736.75664	94%
	ድምር	ሄ/ር	8476.47	10777.7	12920.8	11786.4	15650.164	14359.1	17133.4	15762.9	22004	19936.5	22376.7	21872.1	19159.59	17961.03	117721.0676	112455.757	96%
7	በወረዳዉ ጠቅላላ ለደን ልማት የተጠና መሬት ስፋት	ሄ/ር	8882	8447.7	10928	9928	12408	11368.8	13948	12553	15368.9	14033.4	16007.2	15513.7	17900	17350.08	17900	17350.08	97%
12	ወረዳዉ የደረሰበት የደን ሽፋን መጠን	ሄ/ር	8882	8447.7	10928	9928	12408	11368.8	13948	12553	15368.9	14033.4	16007.2	15513.7	17900	17350.08	17900	17350.08	97%
13	ከጠቅላላ ጥናቱ በአመቱ የለማ መሬት ስፋት	ሄ/ር	3029.2	2896	2725	2510	4073.5	3752	4119.9	4051	7664.78	6833.85	7442	7398.55	8008	6843.847	37062.38	34285.2466	93%
14	ወደፊት መልማት የሚችል መሬት	ሄ/ር	5852.8	5551.7	8203	7418	8334.5	7616.8	9828.1	8502	7704.12	7199.55	8565.15	8115.13	9892	10506.23	58379.671	54909.4134	94%
15	የስራ እድል የተተፈጠረላቸዉ የህ/ብ ክፍሎች																		
	ወንድ	ቁጥር	1384	1316	1703	1547	4144	3983	3303	2799	2023	1704	2471	2494	37355	30350	52383	44193	84%
	ሴት	ቁጥር	37	35	45	41	97	92	81	69	56	49	66	86	1983	1246	2366	1618	68%
	ድምር	ቁጥር	1421	1352	1748	1588	4241	4075	3384	2868	2079	1752	2537	2580	39338	31596	54749	45812	84%
16	በተ/ህብት ሰስረራወዉ የተሳተፉ የህ/ብ ክፍሎች																		
	ወንድ	ቁጥር	2763	2628	3399	3088	6070	5747	5468	4747	4408	3882	4955	4902	38040	31025	65103	56019	86%
	ሴት	ቁጥር	80	76	98	89	156	147	148	130	130	116	143	160	2008	1264	2763	1981	72%
	ድምር	ቁጥር	2842	2703	3497	3177	6226	5894	5616	4877	4538	3998	5098	5062	40048	32289	67866	58000	85%
17	የተገኘ ገቢ	በብር	4672642.6	4444166	5749002	5222922	8715256	8193722	8275036	7252196	7303765	6507929	8015089	7880010	18060830	14121857	60791620.83	53622801.4	88%

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Appendix 4: Different Soil and Water Conservation Practices in Gubalafto Woreda

የ ጉባላፍቶ ወረዳ የአፈርና እርጥበት እቀባ ስራዎች አፈፃፀም

ተ.ቁ	የስራ ዝርዝር	መለኪያ	እስከ 2002 ደረስ	በ2003	በ2004	በ2005	በ2006	በ2007	በ2008	በ2009	ድምር
1	በማሳ ላይ የተከናወኑ ፊዚካላዊ የአፈርና እርጥበት እቀባ ስራዎች										0
	የማሳ ላይ እርከን ስራ	በሄ/ር	360.61	3214	2406.7	7250.67	106.5	8933.5	8424.9	3235.2	33571.47
	የማሳ ላይ እርከን ደረጃ ማሳደግና ጥገና	በኪ/ሜ	4870.8	3266	483.3	1067.45	72.73	356	774.9	6828.5	12848.88
	ጠረንጴዛማ እርከን ስራ	በሄ/ር						72	7.25	12	91.25
	ጠረንጴዛ እርከን ስራ በወል መሬት	በሄ/ር						21.6			21.6
	ጠረንጴዛ እርከን ስራ በግለሰብ መሬት	በሄ/ር						50.4	7.25	12	69.65
	የዉሃ አማራጭ የተዘጋጀለት ጠረንጴዛማ እርከን	በሄ/ር									0
	አዲስ ለተጠቃሚ የተከፋፈለ ጠረንጴዛማ እርከን	በሄ/ር								12	12
	ነባር ለተጠቃሚ የተከፋፈለ ጠረንጴዛማ እርከን	በሄ/ር									0
	ጎርፍ መቀልበሻ ቦይ ስራ	በኪ/ሜ	1039.1	131.65	145.207	38.1	24.5	25.8	13.08	28.437	406.774
	ጎርፍ መቀልበሻ ቦይ ጥገና	በኪ/ሜ	0	105.4	28.94	15.5	6.3	19.35		15	190.49
	ዉሃ ማፋሰሻ ቦይ ስራ	በኪ/ሜ			47.64	0	19.25				66.89
	ዉሃ ማፋሰሻ ቦይ ጥገና	በኪ/ሜ						2.986			2.986
2	የተቀናጀ ተራራ ልማት										0
	የተራቆቱ ተራራማ መሬቶችን መከለል፣መጠበቅና ማልማት	በሄ/ር	0	2078.3	4009	4399.7	4192.65	8295	6210	6477	35661.65
	የጋራ ላይ እርከን ስራ	ኪ/ሜ	10674	3087.5	1879.134	667.3	143	356	653.8	501.2	7287.934
	የጋራ ላይ እርከን + ትሬንች	ኪ/ሜ	0		66.151	667.3	1747.212	1298.63	911.81	813.44	5504.543
	የጋራ ላይ እርከን ደረጃ ማሳደግና ጥገና	ኪ/ሜ	2354.9		66.151	667.3	1747.212	1298.63	911.81	1260.64	5951.743
	አገግሞ ለተጠቃሚ የተከፋፈለ ተራራማ መሬት	ኪ/ሜ									0
3	የእርጥበት እቀባና ውኃ ማስረጊያ ስትራክቸሮችን መስራት										0
	ማይክሮ ትሬንች	ሚ/ቄ	1.517173	0.151955	0.161232	0.118547	0.51	0.0688	0.0106	8905	8906.02113
	ፐርኮሌሽን ትሬንች/አግድም ዝግ ቦይ/	ሚ/ቄ						0.0152		9805	9805.0152
	አይብሮ ቤዚን	ሚ/ቄ		0.012385	0.045274	0.006898	0.016566	0.009143		0.0168	0.107066
	ግማሽ ጨረቃ	ሚ/ቄ	3.337742	0.772155	0.521294	0.288877	0.432	0.08831	0.067	0.0845	2.254136

R

#		Unit									
	ጥልቅ የሆነ የውኃ ማስረጊያ ጉድጓድ	ሚ/ቄ		0.028405	0.011493	0.019756	0.024976	0.006752	0	0.0024	0.093782
	ጥልቅ ያልሆነ የውኃ ማስረጊያ ጉድጓድ	ሚ/ቄ		0.284636	0.152751	0.07355	0.468	0.017201	0.113149	0.0778	1.187087
	ዛይ-ጉድጓድ መቆፈር	ሚ/ቄ	27.5	18.5	18.94	30.88	33.85	39.2	32.05	34.5	207.92
4	**ቦረቦር ልማት**		948.22	360	190	88.56	48.5	186	202.65		1075.71
	የተለየ የቦረቦር መሬት መጠን		758.576	288	152	70.848	38.8	148.8	162.12		860.568
	ክትር ስራ	ሚ/ኩ	1137864	432000	228000	106272	58200	223200	243180	285620	1576472
	ክትር ጥገና	ኪ/ሜ	777.5404	295.2	155.8	72.6192	39.77	152.52	166.173	40	922.0822
	የቦረቦር ቅርፅ ማስተካከል	ኪ/ሜ	622.03232	236.16	124.64	58.09536	31.816	122.016	132.9384	31.5	737.16576
	ቦረቦር መሬትን መከለልና መጠበቅ	ሄ/ር	933048.48	354240	186960	87143.04	47724	183024	199407.6	285620	1344118.64
	አዲስ ለተጠቃሚ የተከፋፈለ ቦረቦር መሬት	ሄ/ር	94.822	36	19	8.856	4.85	18.6	20.265	17.5	125.071
	ነባር ለተጠቃሚ የተከፋፈለ ቦረቦር መሬት	ሄ/ር	75.8576	28.8	15.2	7.0848	3.88	14.88	16.212		86.0568
5	**ስነ - ህይወታዊ የአፈርና እርጥበት እቀባ ስራ**		113786.4	43200	22800	10627.2	5820	22320	24318		129085.2
	እርከንን በዕፅዋት ማጠናከር	ሄ/ር	47.411	18	9.5	4.428	2.425	9.3	10.1325	5377.5	5431.2855
	እርከንን በፍራፍሬ ማልማት	ሄ/ር	37.9288	14.4	7.6	3.5424	1.94	7.44	8.106	349	392.0284
	ቦረቦርን በእፅዋት ማጠናከር	ሄ/ር	56893.2	21600	11400	5313.6	2910	11160	12159	46.8	64589.4
	ቦረቦርን በፍራፍሬ ማልማት	ሄ/ር	28.4466	10.8	5.7	2.6568	1.455	5.58	6.0795	32.6	64.8713
	የሳር ሽንተር እርከን ስራ	ሄ/ር	22.75728	8.64	4.56	2.12544	1.164	4.464	1.3333333	50	72.2867733
	በቁጥቋጦና አረም የተሸፈኑ ተራራማ መሬቶችን ኢኮኖሚያዊ ጠቀሜታ ባላቸው እፅዋት ተክቶ ማልማት	ሄ/ር	34135.92	12960	6840	3188.16	1746	6696	2000	4327	37757.16
6	ሌሎች ስራዎች ካሉ ይጠቀሱ		727.93	360	39.15		55.5	158.5			613.15
			574.6815789	284.2105	30.907895	0	43.815789	125.13158	0		
			873516	432000	46980	0	66600	190200			
	Summary/ማጠቃለያ										
	የማሳ ላይ እርከን ስራ	በሄ/ር	360.61	3214	2406.7	7250.67	106.5	8933.5	8424.9	3235.2	33571.47
	ጠረንጴዛማ እርከን ስራ	በሄ/ር	0	0	0	0	0	72	7.25	12	91.25
	ጠረንጴዛ እርከን ስራ በወል መሬት	በሄ/ር	0	0	0	0	0	21.6	0	0	21.6
	ጠረንጴዛ እርከን ስራ በግለሰብ መሬት	በሄ/ር	0	0	0	0	0	50.4	7.25	12	69.65
	የዉሃ አማራጭ የተዘጋጀላት ጠረንጴዛማ እርከን	በሄ/ር	0	0	0	0	0	0	0	0	0
	አዲስ ለተጠቃሚ የተከፋፈለ ጠረንጴዛማ እርከን	በሄ/ር	0	0	0	0	0	0	0	12	12
	ነባር ለተጠቃሚ የተከፋፈለ ጠረንጴዛማ እርከን	በሄ/ር	0	0	0	0	0	0	0	0	0

የተራቆቱ ተራራማ መሬቶችን መከለል፣መጠበቅና ማልማት	በሄ/ር	0	2078.3	4009	4399.7	4192.65	8295	6210	6477	35661.65
ቦረቦር መሬትን መከለልና መጠበቅ	ሄ/ር	933048.48	354240	186960	87143.04	47724	183024	199407.6	285620	1344118.64
አዲስ ለተጠቃሚ የተከፋፈለ ቦረቦር መሬት	ሄ/ር	94.822	36	19	8.856	4.85	18.6	20.265	17.5	125.071
ነባር ለተጠቃሚ የተከፋፈለ ቦረቦር መሬት	ሄ/ር	75.8576	28.8	15.2	7.0848	3.88	14.88	16.212	0	86.0568
እርከንን በዕፅዋት ማጠናከር	ሄ/ር	47.411	18	9.5	4.428	2.425	9.3	10.1325	5377.5	5431.2855
እርከንን በፍራፍሬ ማልማት	ሄ/ር	37.9288	14.4	7.6	3.5424	1.94	7.44	8.106	349	392.0284
ቦረቦርን በእፅዋት ማጠናከር	ሄ/ር	56893.2	21600	11400	5313.6	2910	11160	12159	46.8	64589.4
ቦረቦርንን በፍራፍሬ ማልማት	ሄ/ር	28.4466	10.8	5.7	2.6568	1.455	5.58	6.0795	32.6	64.8713
የሳር ሸንተር እርከን ስራ	ሄ/ር	22.75728	8.64	4.56	2.12544	1.164	4.464	1.3333333	50	72.2867733
በቁጥቋጦና አረም የተሸፈኑ ተራራማ መሬቶችን ኢኮኖሚያዊ ጠቀሜታ ባላቸዉ እፅዋት ተክቶ ማልማት	ሄ/ር	34135.92	12960	6840	3188.16	1746	6696	2000	4327	37757.16
Summary/ማጠቃለያ		1024745.433	394208.9	211677.26	107323.86	56694.864	218312.76	228278.13	305568.6	1522064.42
የማሳ ላይ እርከን ደረጃ ማሳደግና ጥገና	በኪ/ሜ	4870.8	3266	483.3	1067.45	72.73	356	774.9	6828.5	12848.88
ጎርፍ መቀልበሻ ቦይ ስራ	በኪ/ሜ	1039.1	131.65	145.207	38.1	24.5	25.8	13.08	28.437	406.774
ጎርፍ መቀልበሻ ቦይ ጥገና	በኪ/ሜ	0	105.4	28.94	15.5	6.3	19.35	0	15	190.49
ዉሀ ማፋሰሻ ቦይ ስራ	በኪ/ሜ	0	0	47.64	0	19.25	0	0	0	66.89
ዉሀ ማፋሰሻ ቦይ ጥገና	በኪ/ሜ	0	0	0	0	2.986	0	0	0	2.986
የጋራ ላይ እርከን ስራ	ኪ/ሜ	10674	3087.5	1879.134	667.3	143	356	653.8	501.2	7287.934
የጋራ ላይ እርከን + ትሬንች	ኪ/ሜ	0	0	66.151	667.3	1747.212	1298.63	911.81	813.44	5504.543
የጋራ ላይ እርከን ደረጃ ማሳደግና ጥገና	ኪ/ሜ	2354.9	0	66.151	667.3	1747.212	1298.63	911.81	1260.64	5951.743
አገግሞ ለተጠቃሚ የተከፋፈለ ተራራማ መሬት	ኪ/ሜ	0	0	0	0	0	0	0	0	0
ክትር ጥገና	ኪ/ሜ	777.5404	295.2	155.8	72.6192	39.77	152.52	166.173	40	922.0822
የቦረቦር ቅርፅ ማስተካከል	ኪ/ሜ	622.03232	236.16	124.64	58.09536	31.816	122.016	132.9384	31.5	737.16576
Sub Total	ኪ/ሜ	20338.37272	7121.91	2996.963	3253.6646	3834.776	3628.946	3564.5114	9518.717	33919.488
ክትር ስራ	ሜ/ኩ	1137864	432000	228000	106272	58200	223200	243180	285620	1576472
Sub Total	ሜ/ኩ	1137864	432000	228000	106272	58200	223200	243180	285620	1576472
ማይክሮ ትሬንች	ሚ/ቄ	1.517173	0.151955	0.161232	0.118547	0.51	0.0688	0.0106	8905	8906.02113
ፐርኮሌሽን ትሬንች/አግድም ዝግ ቦይ/	ሚ/ቄ	0	0	0	0	0	0.0152	0	9805	9805.0152
አይብሮ ቤዚን	ሚ/ቄ	0	0.012385	0.045274	0.006898	0.016566	0.009143	0	0.0168	0.107066
ግማሽ ጨረቃ	ሚ/ቄ	3.337742	0.772155	0.521294	0.288877	0.432	0.08831	0.067	0.0845	2.254136
ጥልቅ የሆነ የዉኃ ማስርጊያ ጉድጓድ	ሚ/ቄ	0	0.028405	0.011493	0.019756	0.024976	0.006752	0	0.0024	0.093782
ጥልቅ ያልሆነ የዉኃ ማስርጊያ ጉድጓድ	ሚ/ቄ	0	0.284636	0.152751	0.07355	0.468	0.017201	0.113149	0.0778	1.187087
ዘይ-ጉድጓድ መቆፈር	ሚ/ቄ	27.5	18.5	18.94	30.88	33.85	39.2	32.05	34.5	207.92
Sub Total	ሚ/ቄ	32.354915	19.74954	19.832044	31.387628	35.301542	39.405406	32.240749	18744.682	18922.5984

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Appendix 5: Statistical Mean of the three Disseminations of Sustainability of the 10 PSNP-NRM projects against 7 sustainability indicators

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. tabstat ENSWisePW ENSWiseWM ENSWiseSWC ENSWiseGT ENSWiseNM ENSWiseRC ENSWiseIS ENSWiseAC ENSWiseFM ENSWiseWH ENSP
> rotAC ENSProtPW ENSProtWM ENSProtSWC ENSProtGT ENSProtRC ENSProtIS ENSProtNM ENSProtFM ENSProtWH ECSProdSWC ECSPr
> odIS ECSProdAC ECSProdPW ECSProdRC ECSProdWM ECSProdGT ECSProdWH ECSProdNM ECSProdFM ECSSaleSWC ECSSaleIS ECSSale
> AC ECSSalePW ECSSaleRC ECSSaleWM ECSSaleGT ECSSaleWH ECSsaleNM ECSSaleFM SOSJob SOSCBOs SOSSocialServ, by(Kebele)
>  columns(variables)

Summary statistics: mean
  by categories of: Kebele ( Sampled Kebele)
```

Kebele	ENSWis~W	ENSWi~WM	ENSWi~WC	ENSWis~T	ENSWi~NM	ENSWi~RC	ENSWis~S	ENSWi~AC	ENSWi~FM	ENSWis~H
Dorogibir KA	3.30303	2.909091	2.666667	2.545455	1.939394	2.666667	3.969697	3.969697	2.757576	1.575758
Jarsssa KA	3.413043	2.804348	2.891304	2.652174	2.326087	2.304348	4.347826	3.891304	2.673913	1.543478
Gedober KA	3.468085	2.361702	3.085106	2.851064	1.914894	2.425532	4.021277	4.574468	2.723404	1.531915
Woynye KA	3.4	2.8	2.5375	2.8	1.9625	2.85	4.1375	4.4875	2.525	1.468354
Ahuntegegn KA	3.348315	2.595506	3.011236	3.022472	1.94382	2.775281	4.179775	4.539326	2.651685	1.47191
KossoambaKA	3.362069	2.637931	2.741379	3.534483	1.913793	3.068966	4.103448	4.672414	2.62069	1.5
Total	3.382436	2.674221	2.82153	2.94051	1.988669	2.72238	4.13881	4.416431	2.640227	1.502841

Kebele	ENSPr~AC	ENSPro~W	ENSPr~WM	ENSPr~WC	ENSPro~T	ENSPr~RC	ENSPro~S	ENSPr~NM	ENSPr~FM	ENSPro~H
Dorogibir KA	3.242424	3	3.030303	2.424242	2.818182	3.121212	3.878788	3.060606	2.515152	2.151515
Jarsssa KA	2.869565	3.282609	3.043478	2.456522	2.782609	3.173913	3.521739	2.804348	2.391304	2.130435
Gedober KA	3.723404	3.361702	3.148936	2.510638	2.702128	3.446809	3.212766	2.617021	3.106383	2.148936
Woynye KA	3.4125	4.075	3.0625	2.6625	2.8875	3.0125	3.4875	2.7875	3.05	2.1125
Ahuntegegn KA	3.337079	3.764045	2.94382	2.438202	2.842697	2.820225	3.561798	2.550562	3.179775	2.101124
KossoambaKA	3.189655	3.672414	2.982759	2.517241	2.862069	2.896552	3.12069	2.87931	3.155172	2.155172
Total	3.311615	3.631728	3.025496	2.512748	2.827195	3.033994	3.450425	2.747875	2.971671	2.127479

Kebele	ECSPr~WC	ECSPro~S	ECSPr~AC	ECSPro~W	ECSPr~RC	ECSPr~WM	ECSPro~T	ECSPro~H	ECSPr~NM	ECSPr~FM
Dorogibir KA	3.393939	3.606061	2.666667	2.969697	2.606061	3.181818	2.606061	1.575758	1.939394	3.030303
Jarsssa KA	3.565217	4.086957	3.108696	2.782609	2.217391	2.73913	2.782609	1.586957	2.413043	3.108696
Gedober KA	3.680851	3.574468	3.276596	2.765957	2.531915	2.978723	3.531915	1.531915	2.170213	3.106383
Woynye KA	4.525	3.4	3.275	3.0375	2.7875	3.1625	3.35	1.5375	2.175	2.875
Ahuntegegn KA	4.449438	3.449438	3.516854	2.808989	2.932584	3.213483	3.337079	1.550562	2.179775	2.853933
KossoambaKA	4.103448	3.810345	3.310345	2.913793	3.258621	3.844828	3.5	1.551724	2.137931	3.189655
Total	4.093484	3.611898	3.263456	2.883853	2.776204	3.209632	3.252125	1.552408	2.17847	2.997167

Kebele	ECSSa~WC	ECSSal~S	ECSSa~AC	ECSSal~W	ECSSa~RC	ECSSa~WM	ECSSal~T	ECSSal~H	ECSsal~M	ECSSa~FM
Dorogibir KA	4.787879	3.787879	2.787879	2.757576	4.424242	2.727273	2.606061	2	2.333333	2.878788
Jarsssa KA	4.76087	4.152174	3.195652	3.5	3.913043	2.913043	2.630435	2.173913	2.782609	2.673913
Gedober KA	3.851064	3.829787	3.404255	3.255319	3.276596	3.106383	2.829787	1.595745	2.829787	2.425532
Woynye KA	3.2875	4.025	3.025	2.8875	3.325	2.9625	2.825	1.7375	3.1875	2.3125
Ahuntegegn KA	3.269663	3.629213	3.235955	2.865169	3.449438	3.157303	2.955056	1.707865	2.696629	2.651685
KossoambaKA	3.068966	3.206897	3.448276	2.741379	3.534483	2.844828	2.896552	1.172414	2.206897	3.137931
Total	3.654391	3.759207	3.1983	2.974504	3.563739	2.983003	2.824363	1.699717	2.72238	2.648725

Kebele	SOSJob	SOSCBOs	SOSSoc~v
Dorogibir KA	4.030303	4.333333	3.090909
Jarsssa KA	4.108696	4.391304	3.369565
Gedober KA	4	4	2.893617
Woynye KA	3.975	3.825	2.85
Ahuntegegn KA	4.224719	4.224719	2.853933
KossoambaKA	4.327586	4.327586	2.758621
Total	4.121813	4.152975	2.932011

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Appendix 6: Research Questionnaire

St. Marry University
School of Graduates
Department of Project Management
Introduction

This research questionnaire is designed to conduct a research on "Local Community Participation in NRM projects and their Sustainability, The Case of PSNP in Gubalafto Woreda, Amhara Region". The study will be conducted for partial fulfillment of master degree in Project Management at St. Mary's University. Hence, you are kindly requested to provide thoughtful and honest responses that will give the most valuable information for the research. The researcher wants to assure you that this research is intended fully for academic purpose and all information that you will provide will be kept confidential and cannot be shared without the willingness and consent of the sources of information. Your honest and complete responses are so vital for the successful completion of the study. The researcher would like to thank you in advance for your kind cooperation.

This questionnaire has four (4) parts. Part-I is the respondents' basic information, Part-II is Socio-Economic Characteristics of Households; Part III is about PSNP-NRM projects implemented in the study area, Part-IV is about participation of local community in the project cycle management of PSNP-NRM projects, and Part-V is about sustainability of those PSNP-NRM projects in the area.

Part I: Basic Information of the Respondent

1. Name of Enumerator : ------------------------------- Signature ----------- Date---------------

2. **Questionnaire/Respondent's/ Code (ID #): _____ (Use 001, 002, 003 … 010, 011, 013 … 100, 101, 102 … n to code each questionnaire)**

3. Age of Respondent: 1/ Below 16 years old (16 not inclusive) □   2/16-60 years old (60 not inclusive) □   3/60 years old and above □

4. Sex of the respondent: 1/ male □   2/female □

5. Educational level of respondent: 1/ Illiterate   2/Elementary level I (grade 1-4) completed □   3/Elementary level II (grade 5-8) completed □   4/   High school (grade 9-10) completed □   5/Preparatory (grade 11-12) completed □
            6/Above grade 12 (graduates)

Part II: Socio-Economic Characteristics of Households

Kindly choose from the alternatives given and put check mark (√) in the given box(s) for your choice (s) or fill your choice in the black spaces if the given alternatives do not exhaust the possible choices.

1. Respondents' Household Category in PSNP-NRM LBPWs: 1/ PDS □   2/ LBPW □

2. Condition of the respondent's household: 1/Permanently ill □   2/Disabled □ 3/Children under 16 years old (16 not inclusive) □ 4/ elders above 60 years old □ 5/Temporarily ill 6/Lactating mother of less than 6 months □   7/Pregnant Woman of more than 6 months □ 8/ normal able body □ 9/other (specify) ……

3. Sex of head of household head: 1/Male headed □   2/Female headed □

4. Family size of the household: 1/ 1-3 □   2/4-6 □   3/ 7-9 □   4/ 10 and above □

5. Number of family members registered under PSNP (fixed- 1-5): _____

6. Number of family members registered under LBPW (fixed 0-3): _____

7. Age of household head: 1/ below 16 years old (16 not inclusive) □   2/16-39 years old (inclusive) □   3/40-60 years old (60 not inclusive) □   4/ 60 years old and above □

8. Does the household have access to land for agricultural use? 1/ Yes □ 2/ No □

9. If your answer is yes for question #9, how did you get access to it? 1/ Through land redistribution □ 2/   Shared with parents/relatives □ 3/Inherited from parents □ 4/Purchase/leased for long period   5/rented in seasonal bases □ 6/Others (specify) _____

10. If your answer for #9 is yes, what is the total size of your land hold size in hectares/ha/? 1/ less-0.25 ha □ 2/0.25-0.5 ha □   3/ 0.5-1 ha □   4/ Above 1ha □

11. What is the major occupation of the household? 1/Mixed farming □ 2/Crop production □ 3/ animal husbandry □ 4/ off-farm activities like pity trading, labor migration, … □ 5/fuel wood selling □ 6/ Other (specify)_____

12. Is your annual income enough to satisfy your family's annual consumption? 1/ Yes □ 2/No □

13. If your answer for question 13 is no, for how many months is it sufficient? 1/ less than 3 months □ 2/ 3-4 months □ 3/ 4-6 months □ 4/6-9 months □ 5/more than 9 months □

14. If your household's annual income is insufficient to satisfy your annual consumption, how do you satisfy the shortage? 1/ PSNP support (Food for work, PSD, contingency and risk financing), Assistance from relatives □ 2/ Assistance & credit from relatives □ 3/ labor migration □ 4/ permanent migration □ 5/ income from off-farm activities □ 6/ other (specify) _____

15. What is/are the constraints of agriculture in your area? 1/ Shortage of farmland □ 2/ Poor soil fertility □ 3/ Scarcity of grazing land □ 4/ shortage of moisture /rainfall □ 5/ hazards like crop pests, frost, crop disease…□ 6/ access and affordability of agricultural inputs like improved varieties, fertilizer □ … 7/ knowledge gap and inadequate extension support □ 8/other (specify) _____

Part III: Questions Related to PSNP-NRM Projects in the Research Area

Kindly choose from the alternatives given and put check mark (√) in the given box(s) for your choice (s) or fill your choice in the black spaces if the given alternatives do not exhaust the possible choices for question 5 and rate using the alternatives given and put check mark (√) in the box or cell provided within the table for your choice (s) question 1 and 2.

1. Which PSNP-NRM Project(s) are implemented in your *kebele* (choose one or more)?
   1/ Physical SWC □ 2/ Biological SWC □ 3/ Gully Treatment □ 4/ Nursery management □ 5/Forage/fodder nursery management □ 6/Area closure □ 7/watershed management □ 8/Rain water harvesting & Management □ 9/ potable water development and management 10/ Irrigation scheme development and management 11/ rural roads catchment management 12/Other (specify) _____

2. Using table 1 below, indicate the start year of PSNP-NRM project in your *kebele*. Put "√" in the space provided corresponding to the projects.

Table 1: Starting period and current conditions of PSNP-NRM projects

PSNP-NRM Projects	Starting period (Years) and their current status												
	2005 (13)	2006 (12)	2007 (11)	2008 (10)	2009 (9)	2010 (8)	2011 (7)	2012 (6)	2013 (5)	2014 (4)	2015 (3)	2016 (2)	2017 (1)
2.1. Physical SWC													
2.2. Biological SWC													
2.3. Gulley Treatment													
2.4. Nursery management													
2.5. Forage/fodder Planation and management													
2.6. Watershed mgmt.													
2.7. Area closure Mgmt.													
2.8. Rain water harvesting													
2.9. Potable water development													
2.10. Irrigation scheme development													
2.11. Rural roads construction													
2.12. Other specify ---													

Y

Table 2: Current conditions/Status of PSNP-NRM projects

PSNP-NRM Projects	Exist to date without rehabilitation needed and fully owned by the community (5)	Exist with some rehabilitation works through initiatives of the community (4)	Exist with some rehabilitation works for material incentives through initiatives of externals (3)	Exist with repeated rehabilitation works by unilateral orientations and directions by externals (2)	Rarely exist though repeated rehabilitation works forced by externals (1)	Not Applicable (0)
2.13. Physical SWC						
2.14. Biological SWC						
2.15. Gulley Treatment						
2.16. Nursery management						
2.17. Forage/fodder Planation and management						
2.18. Watershed mgmt.						
2.19. Area closure Mgmt.						
2.20. Rain water harvesting						
2.21. Potable water development						
2.22. Irrigation scheme dev't						
2.23. Rural roads construction						
2.24. Other specify ----------						

Part IV: Questions Related to Local Community Participation in PSNP-NRM Projects in the Study Area

Kindly rate using the alternatives given and put check mark (√) in the box or cell provided within the table for your choice (s) for Questions and Sub-questions under 3 to 6.

3. Using a rating of 1 to 5 please indicate your view towards <u>your level of participating in the PSNP-NRM Projects</u>, where 5= strongly agree; 4= agree; 3 = neutral; 2= disagree; 1= strongly disagree

Table 3: Indicate/rate your levels of participation in PSNP-NRM projects phases in your village/kebele

Levels of Participation	Rate at Different Phases																								
	Project Initiation					Project Planning					Project Execution					Project Monitoring & Controlling					Project Closing				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1.1.Community Pretense, with nominated representatives having no legitimacy or power (**Manipulative Participation/false participation**) in PSNP-NRM Projects																									
1.2.Unilateral announcements of externals without listening to people's responses (**passive participation**) in PSNP-NRM Projects																									
1.3.External agents define problems and information-gathering processes and so control analysis (**Consultative participation**) in PSNP-NRM Projects																									
1.4. People participate by contributing resources (labor) in return for material incentives /payments/ (**Participation for Material Incentives**) in PSNP-NRM Projects																									
1.5. External agencies encourage participation to meet predetermined objectives of the community (**Functional Participation**) in PSNP-NRM Projects																									
1.6. People participate (as a right) in joint analysis, development of action plans and formation or strengthening of local institutions (**Interactive participation**) in PSNP-NRM Projects																									
1.7. People take initiatives independently of external institutions to change systems (**Self-Mobilization/True participation**) in PSNP-NRM Projects																									

4. Using a rating of 1 to 5 please indicate your view towards <u>methods of community participating in the PSNP-NRM Projects</u>, where 5= strongly agree; 4= agree; 3 = neutral; 2= disagree; 1= strongly disagree

Table 4: Rate your methods of participation in PSNP-NRM projects in your village/kebele

Description of Method of participation	Rate				
	1	2	3	4	5
4.1.No noticeable contribution in any PSNP-NRM events					
4.2. Attending problem identification and planning meetings of PSNP-NRM projects initiated by externals					
4.3. Contribute labor for the implementation of PSNP-NRM projects					
4.4.Contribution of resources (local material, money, …) for of PSNP-NRM projects					
4.5. Suggest project ideas for PSNP-NRM projects as member of the local community					
4.6. Initiating problem identification, planning and implementation of PSNP-NRM projects as member of the local community					

5. Using a rating of 1 to 5 please indicate your view towards <u>the purpose of your participating in the PSNP-NRM Projects</u>, where 5= strongly agree; 4= agree; 3 = neutral; 2= disagree; 1= strongly disagree

Table 5: Rate purpose of your participation in PSNP-NRM projects in your village/kebele

Description of Purposes of Participation of the Community	Rate				
	1	2	3	4	5
5.1. **Forced**-Externals like local GoE forced community for PSNP-NRM planning and implementation					
5.2. **Societal Influence**-Not to be exceptional from neighbors to local government and community					
5.3. **Existence of Payment** – to get paid for the time spent on project-related labor contributions					
5.4. **Low Productivity & Production of Agriculture/low income/**- no other livelihood options better than PSNP cash and food transfers					
5.5. **Inclusion/Potential Benefits** – to retain some access to potential benefits of PSNP-NRM projects					
5.6. **Leverage /Control/ownership**– to influence the shape the project takes and its management					
5.7. **Empowerment** – to be able to decide and act for oneself					

6. Using a rating of 1 to 5 please indicate your view towards <u>factors affecting community participation in the PSNP-NRM Projects</u>, where 5= strongly agree; 4= agree; 3 = neutral; 2= disagree; 1= strongly disagree

Table 6: Rate factors affecting your participation in PSNP-NRM projects in your village/kebele

Factors Affect participation of the household in PSNP-NRM projects	Rate				
	1	2	3	4	5
6.1. **Awareness**- (awareness about the benefits of PSNP-NRM projects)					
6.1.1. Externals did enough awareness raising of local community on process and benefits of PSNP-NRM projects that enhanced local community participation					
6.1.2. More aware community members participated better than none or little aware ones					
6.1.3. Awareness has nothing to do with local community participation in PSNP-NRM projects LBPWs					
6.2. **Education/Knowledge** – (academic status of the househol4/members)					
6.2.1. Literate community members participated more than illiterate ones					
6.2.2. Illiterate community members participated more than literate ones					
6.2.3. Educational level has nothing to do with participation of the local community					
6.3. **Skill**- (The experience & practice of community members in PSNP-NRM LBPWs)					
6.3.1. More experienced community members in PSNP LBPWs participate more than newly registered PSNP beneficiaries					
6.3.2. Newly registered PSNP beneficiaries participate more than experienced ones in PSNP-NRM-LBPWs					
6.3.3. Skill & Experience has nothing to do with participation of local community in PSNP-NRM-LBPWs					
6.4. **Material Incentives: -** (payments given in exchange of labor contributed for PSNP-NRM LBPWs projects)					

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	1	2	3	4	5
6.4.1. Grain & cash payments (ration) in exchange of labor contributed for PSNP-NRM LBPWs projects enhanced participation					
6.4.2. If there was no payment for PSNP-NRM LBPWs, no one from the community would participate in those activities					
6.4.3. Material incentives has nothing to do with local community participation in PSNP-NRM LBPWs projects					
6.5. Level of income of the household- (wealth group of community household (HHs) affect participation)					
6.5.1. Poorest of the poor participate more than middle and better off households					
6.5.2. Middle level HHs participate better than poor and rich HHs					
6.5.3. Better off HHs participate more than middle and poor HHs					
6.5.4. Level of income of HHs has nothing to do with local community participation in PSNP-NRM LBPWs projects					
6.6. Distribution of PSNP-NRM Project Benefits- (Fairness of management of the PSNP_NRM project outcomes distribution among community members)					
6.6.1. Poor HHs prioritized more than middle and better off HHs for NRM projects benefits					
6.6.2. Middle HHs prioritized more than poor and better off HHs for NRM projects benefits					
6.6.3. Better off HHs prioritized more than middle and poor HHs for NRM projects benefits					
6.6.4. Community members have equal share in PSNP-NRM projects benefits without any difference					
6.6.5. Landless youth households prioritized more than other community members for NRM projects benefits					
6.6.6. Youths households prioritized more than other community members for NRM projects benefits					
6.6.7. Decisions and distribution of NRM Project Benefits has nothing to do with local community participation in PSNP-NRM LBPWs projects					
6.7. Landownership- (Government Vs. private, Communal Vs private)					
6.7.1. HHs more interested to participate on PSNP-NRM LBPWs in private lands than communal ones					
6.7.2. HHs more interested to participate on PSNP-NRM LBPWs in Communal lands than private ones					
6.7.3. The current system of landownership (owned by government) enhanced community participation in PSNP-NRM projects					
6.7.4. Private ownership of land will enhance community participation in PSNP-NTM projects than being owned by government					
6.7.5. Land ownership has nothing to do with local community participation in PSNP-NRM LBPWs					
6.8. Extraordinary/special Attention- (voice of some community members are heard than others by GoE and NGOs)					
6.8.1. Voice of women are heard during PSNP-NRM projects phases and participated more than other groups					
6.8.2. Voice of middle age (16-59 years old inclusive) are heard & participate more than other groups in PSNP-NRM projects in your villages/kebele					
6.8.3. Voice of old people are heard during PSNP-NRM projects phases and participated more than other groups					
6.8.4. Voice of children (<16 years old) are heard during PSNP-NRM projects phases and participated more than other groups					
6.8.5. Voice of disable/ill people are not heard during PSNP-NRM projects phases and participated more than other groups					

6.8.6. Voice of the poor are heard during PSNP-NRM projects phases and participated more than other groups					
6.8.7. Extraordinary attention has nothing to do with local community participation in PSNP-NRM LBPWs projects					
6.9. Top Down Approach- (Interference of Externals)					
6.9.1. PSNP-NRM projects are implemented for political consumption					
6.9.2. GoE forced community members to perform PSNP-NRM LBPWs					
6.9.3. NGOs forced community members to perform PSNP-NRM LBPWs					
6.9.4. Absentees from PSNP-NRM LBPWs will face administrative measures					
6.9.5. Top-down approach has nothing to do with local community participation in PSNP-NRM LBPWs projects					
6.10. Loan/Credit access (GoE credit is given priory to PSNP beneficiaries)					
6.10.1. Credit due to membership of PSNP motivate community members to participate in PSNP-NRM LBPWs projects					
6.10.2. Credit due to membership of PSNP demotivate community members to participate in PSNP-NRM LBPWs projects					
6.10.3. Credit due to membership of PSNP has nothing to do to participate in PSNP-NRM LBPWs projects					
6.11. Age (Children, youth, adult (18-59 years old), old people (> 60 years old)					
6.11.1. Children community participated more than other age groups members					
6.11.2. youth community participated more than other age groups members					
6.11.3. adult community participated more than other age groups members					
6.11.4. old community participated more than other age groups members					
6.11.5. age group has nothing to do with participation of the community in PSNP-NRM Projects					
6.12. Sex group (Male, Female)					
6.12.1. Male community members participated more than female ones					
6.12.2. Female community members participated more than male ones					
6.12.3. Sex difference has nothing to do with participation of the community in PSNP-NRM Projects					
6.13. Health Condition (healthy, permanently ill, disabled)					
6.13.1. Healthy community members participated more than other groups					
6.13.2. Permanently ill community members participated more than other groups					
6.13.3. Health condition has nothing to do with participation of the community in PSNP-NRM Projects					

7. Using a rating of 1 to 5 please indicate your view towards <u>phases of PSNP-NRM Projects in which true community participation has been exercised</u>, where 5= strongly agree; 4= agree; 3 = neutral; 2= disagree; 1= strongly disagree

<u>Part V: Questions Related to Sustainability of PSNP-NRM Projects in Study Area</u>
Kindly rate using the alternatives given and put check mark (√) in the box or cell provided within the table for your choice (s) for questions and sub-questions under 7 and 9.

8. What are the major factors affecting sustainability of PSNP-NRM projects in your *Kebele* (choose one or more)? 1/ participation and ownership of the community □ 2/ rainfall/moisture □ 3/population pressure □ 4/free grazing □ 5/land degradation 6/deforestation □ 7/Soil fertility (for biological projects) □ 8/dependency on LBPW income and deliberate destruction by the community for re-work □ 9/natural disaster like frost, landslide, flood □ 10/ Use of fire wood and charcoal as sources of

energy/income/ ☐   11/ use of grass and wood for construction   12/Use of Kerosene

and Gas as source of energy ☐ 14/other (specify) _____ ☐

9. For the questions in table 8, please indicate your view towards <u>factors that affect sustainability of PSNP-NRM Projects from the prospective of the three dimensions of sustainability</u> using 1=Yes and 2=No.

Table 7: Identify which factor(s) affect sustainability of PSNP-NRM projects in your village/kebele

Factors Affect Sustainability of PSNP-NRM Projects	Response	
	1	2
9.1. Community participation in project phases/cycles such as initiation, planning, execution, monitoring/controlling and closing affects sustainability of PSNP-NRM Projects		
9.2. Rainfall/moisture affects sustainability of PSNP-NRM Projects		
9.3. Population pressure affects sustainability of PSNP-NRM Projects		
9.4. Free grazing affects sustainability of PSNP-NRM Projects		
9.5. Land degradation/soil erosion affects sustainability of PSNP-NRM Projects		
9.6. Deforestation affects sustainability of PSNP-NRM Projects		
9.7. Soil fertility (for biological projects) affects sustainability of PSNP-NRM Projects		
9.8. Dependency syndrome /LBPW income and deliberate destruction by the community for re-work affects sustainability of PSNP-NRM Projects/		
9.9. Natural disaster like frost, landslide, flood affect sustainability of PSNP-NRM Projects		
9.10. Use of fire wood and charcoal as sources of energy and income affect sustainability of PSNP-NRM Projects		
9.11. Use of grass and wood for house and other constructions affect sustainability of PSNP-NRM Projects		
9.12. Availability of alternative sources of energy line electricity, Kerosene and Gas as source of energy affect sustainability of PSNP-NRM Projects		
9.13. Land Ownership Policy of Federal Democratic Republic of Ethiopia		
9.14. Other (Specify ……………………..)		

10. Using a rating of 1 to 5 please indicate your view towards <u>the level of effect of factors that affect sustainability of PSNP-NRM Projects from the prospective of the three dimensions of sustainability,</u> where 5= strongly agree; 4= agree; 3 = neutral; 2= disagree; 1= strongly disagree. Assumed that all factors are in their positive state towards affecting sustainability so as to make the directions of change to be uniform and to assume all factors except participation are controlled.

Table 8: Rate factors affecting the Sustainability of PSNP-NRM projects in your village/kebele

Factors Affect Sustainability of PSNP-NRM Projects	Rate				
	1	2	3	4	5
10.1. There has been community participation in project phases/cycles such as initiation, planning, execution, monitoring/controlling and closing which enhanced sustainability of PSNP-NRM Projects in your village/kebele					
10.2. There has been availability of enough rainfall/moisture in time and place indefinitely which ensured sustainability of PSNP-NRM Projects in your village/kebele (take 2005 as reference year-HEA)					
10.3. There has not been population pressure which affected sustainability of PSNP-NRM Projects in your village/kebele					
10.4. There has not been free grazing which affected sustainability of PSNP-NRM Projects in your village/kebele					
10.5. There has not been land degradation/soil erosion/ which affected sustainability of PSNP-NRM Projects in your village/kebele					
10.6. There has not been deforestation which affected sustainability of PSNP-NRM Projects in your village/kebele					
10.7. There has been good soil fertility that enhances sustainability of PSNP-NRM Projects in your village/kebele					
10.8. There has not been dependency syndrome /LBPW income and deliberate destruction by the community for re-work / which affected sustainability of PSNP-NRM Projects in your village/kebele					
10.9. There have not been natural disasters like frost, landslide, flood, fire, etc. which harmed sustainability of PSNP-NRM Projects in your village/kebele					
10.10. There has not been use of fire wood and charcoal as sources of energy and income that affect sustainability of PSNP-NRM Projects in your village/kebele					
10.11. There has not been use of grass and wood for house and other constructions which affected sustainability of PSNP-NRM Projects in your village/kebele					
10.12. There has been availability of alternative sources of energy line electricity, Kerosene and Gas as source of energy which enhanced sustainability of PSNP-NRM Projects in your village/kebele					
10.13. State ownership and land tenure system /Land Ownership Policy/ of Federal Democratic Republic of Ethiopia boosted sustainability of PSNP-NRM projects					

11. Using a rating of 1 to 5 please indicate your view towards <u>sustainability of PSNP-NRM Projects from the prospective of the three dimensions of sustainability</u>, where 5= strongly agree; 4= agree; 3 = neutral; 2= disagree; 1= strongly disagree

Table 9: Rate the Sustainability of PSNP-NRM projects in your village/kebele using the sustainability indicators

Rate the sustainability of PSNP-NRM projects from the prospective of the three dimensions of sustainability against the given indicators	Rate				
	1	2	3	4	5
11.1. Environmental Sustainability (0.5390): - The largest system of them all is the biosphere we live in. It contains the human system, which has two main systems: social and economic.					
11.1.1. Community owned all PSNP-NRM projects and ensures wise uses by its own bylaws without any intervention from externals indefinitely					
11.1.2. Community protects PSNP-NRM projects from any exploitation, destruction and neglect by strong community bylaws indefinitely (not by security guards)					
11.2. Economic Sustainability (0.2973): - (the ability of an economy to support a defined level of economic production indefinitely)					
11.2.1. Community has got the economic benefits from PSNP-NRM projects implemented in your villages/kebele in the past and will continue for the future indefinitely with respect to improved productivity and production					
11.2.2. Community has got economic benefits from PSNP-NRM projects implemented in your villages/kebele in the past and will continue for the future indefinitely in respect to income from sale of products and byproducts of:					
11.3. Social Sustainability (0.1638): - (the ability of a social system, such as a country, to function at a defined level of social wellbeing indefinitely, which is (or should be) to optimize quality of life for those living and their descendants.)					
11.3.1. PSNP-NRM projects have created job opportunities for the community in your village/kebele in a sustainable way					
11.3.2. Community-based organizations/CBOs/ are established and run for PSNP-NRM projects management in the past and will continue for the future indefinitely					
11.3.3. Social services such as road accessibility to market, school, health services, potable water, technology, transport/logistics etc. enhanced indefinitely due to implementation of PSNP-NRM projects in your locality					

The End… Thanks,

Appendix 7: FGD Interview Guiding Questions/Checklist

1. What are the PSNP-projects implemented in your village/Kebele?
2. How was the project identification, planning, implementation and monitoring and evaluation process of each of them in your village/kebele?
3. Are the community-based organizations & committee like watershed committee, Kebele and Community FSTFs, Appeal Committee, Targeting Committee, … established to facilitate PSNP-NRM projects management still exist deliver the services?
   3.1. If yes, which of them work proactively and what is the COBs/committees doing currently?
   3.2. If no, what happened to them/Why not?
4. Who is currently managing of PSNP-NRM projects like biotic and abiotic SWC, catchment management, area closure, gully treatments, water harvesting structures, nurseries and others?
   4.1. Projects/NGOs (mention names of NGOs)
   4.2. Government (mention office names)
   4.3. Community
   4.4. Beneficiaries
5. Are the catchment and closed areas looked after by a security person? How & Why?
6. If answer for Q#4 is yes, who pays for the security guards of the NRM projects?
   6.1. Projects/NGOs (mention names of NGOs)
   6.2. Government (mention office names)
   6.3. Community
   6.4. Beneficiaries
   6.5. How sustainable is the system?
   6.6. What will happen if the areas are not looked after by a security person?
7. If you are allowed to share the developed areas among catchment community, what will be your plan on your share? What do you expect others to do on their shares? Why?
8. what benefits does the community get from PSNP-NRM projects?
   8.1. Social Benefit
   8.2. Economic Benefit
   8.3. Environmental Benefit
9. How long will the benefits last?
10. Do know whether or there is or not any NRM sustainability policy and strategy of the Ethiopia?
11. If your answer for Q10 is yes, has it implementation strategy for each them of sustainability (environmental, Economic, social)?
12. If your answer for Q11 is yes, is it implemented properly and resulted in sustainability of NRM projects as intended?
13. If your answer for Q12 is no, what are the reasons?
14. What contributions PSNP-NRM projects have to combat crimes in the locality?

This thesis is submitted to St Mary's University, School of Graduates Studies for examination with my approval as University Advisor.

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Chalachew Getahun (PhD)   Signature & Date

                                        St. Mary University, Addis Ababa, May, 2018